

Borg El Arab Train Station

New Borg EL Arab city

NOURHAN MOSTAFA TAHA



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New Borg El-Arab city

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Train

A train is a form of public transport consisting of a series of vehicles that usually runs along a rail track to transport cargo or passengers.

Railway station

A railway station is a building by a railway line where trains stop so that people can transport from & to other place, Provide them with the amenities and necessary services for facilitating movement.

Reason for choosing the project

- We have in our cities urban growth rate of more than world's cities and that a reflection of population growth, construction movement and increase the number of projects which brings increasingly preparation of citizens . For this reason it's important to provide roads and public transport for easy moving between the cities so transportation contribute to Development of civilization .**
- Provide aesthetically pleasing and visually engaging surroundings that people will enjoy while waiting for the trains to arrive.**
- Maintain quality design standards through the design and construction process so that station facilities will endure public use for many years.**
- Accommodate for safe and practical circulation methods between the various station components and parking drop-off areas.**
- Provide innovative and user-friendly station facilities incorporating supporting facilities such as concession areas, waiting rooms, restrooms, and ticket booths.**

2. Site location & the reason of choice

Site location

- New Burg Al Arab , residential and industrial city , first generation city in Egypt . Created presidential.
- decree no. 506 year.1979 , adapted in the planning Dutch experience.
- The New Burg Al Arab ,60km west of Alexandria city , tracking district Burg Al Arab which tracking Alexandria governorate since 1990
- presidential, 7 km. Away from Mediterranean Sea beach by Alex Matronh rod.
- The site that is located on the high ground 28 meters from the sea level, which makes a climate dry and not wet .
- Size : 47,500 acres
- Area residents : 26.300 acres

The reason of choice

- The number of projects that have been implemented and will be implemented over the coming years in the new Burg Al Arab city , special in the first residential district , like services and residential building, led to the demand of the people to the city during the recent period , population become in a big need for public transport, and special trains to link Burg Al Arab with Alexandria for more facilities movement near their homes.
- One of the most important reasons for choosing the location was near residential units , population can easily access to it and easily navigate through train.



Figure 1 - Egypt map

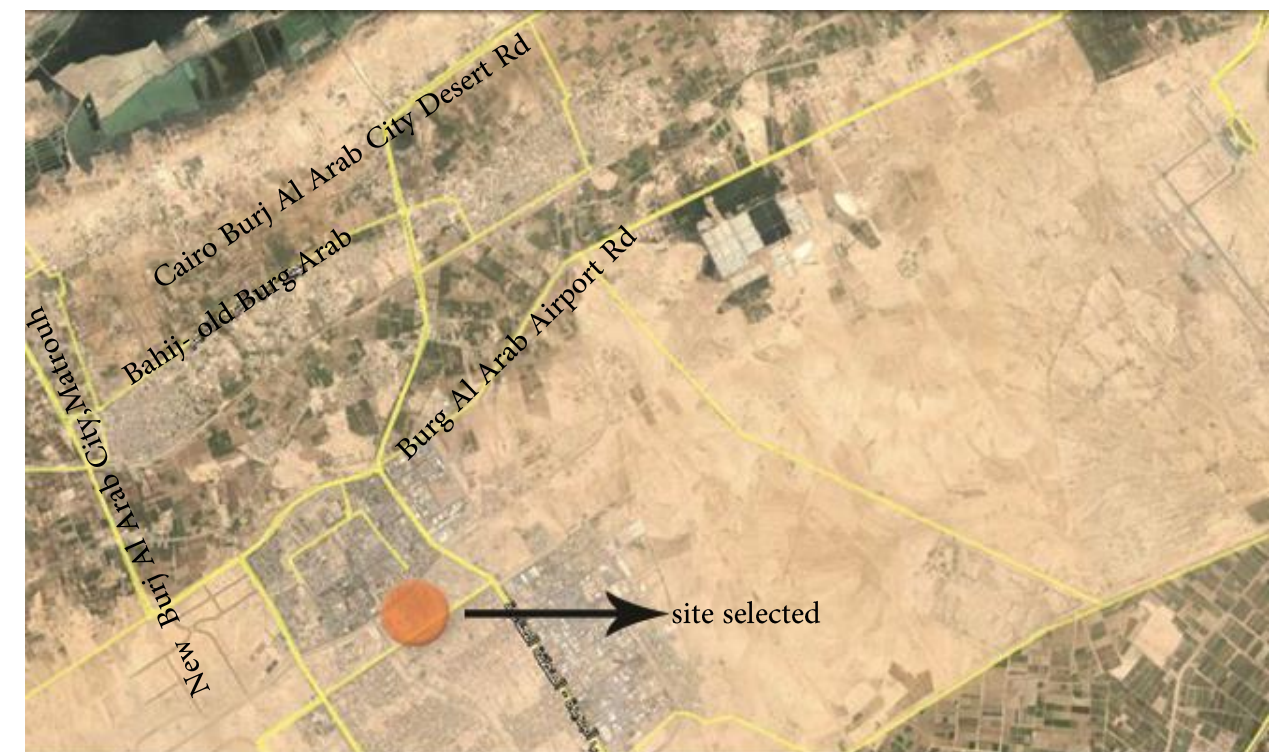


Figure 2-New Borg El Arab city

2.1 Location & services of the city

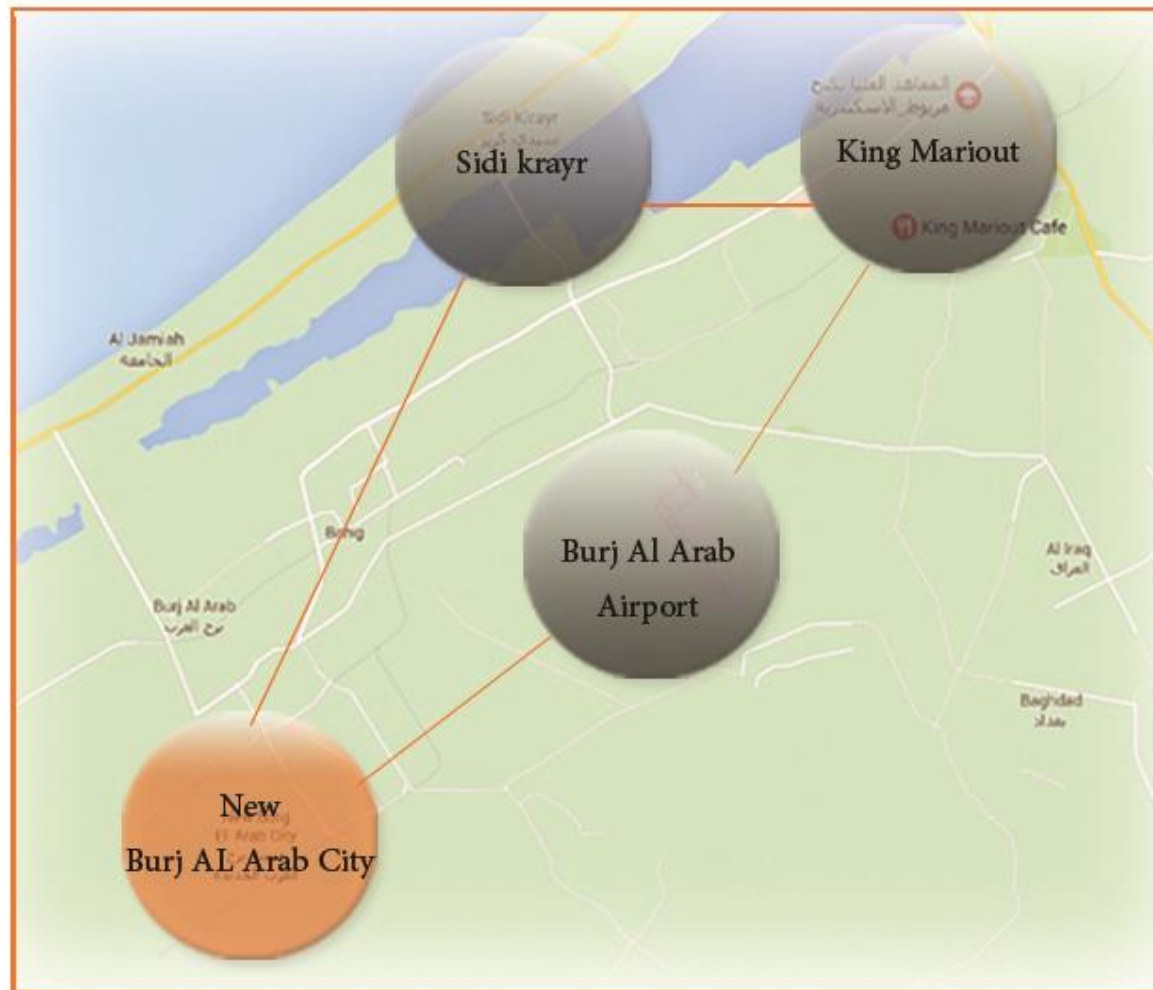


Figure 3 Show important areas surrounding the site

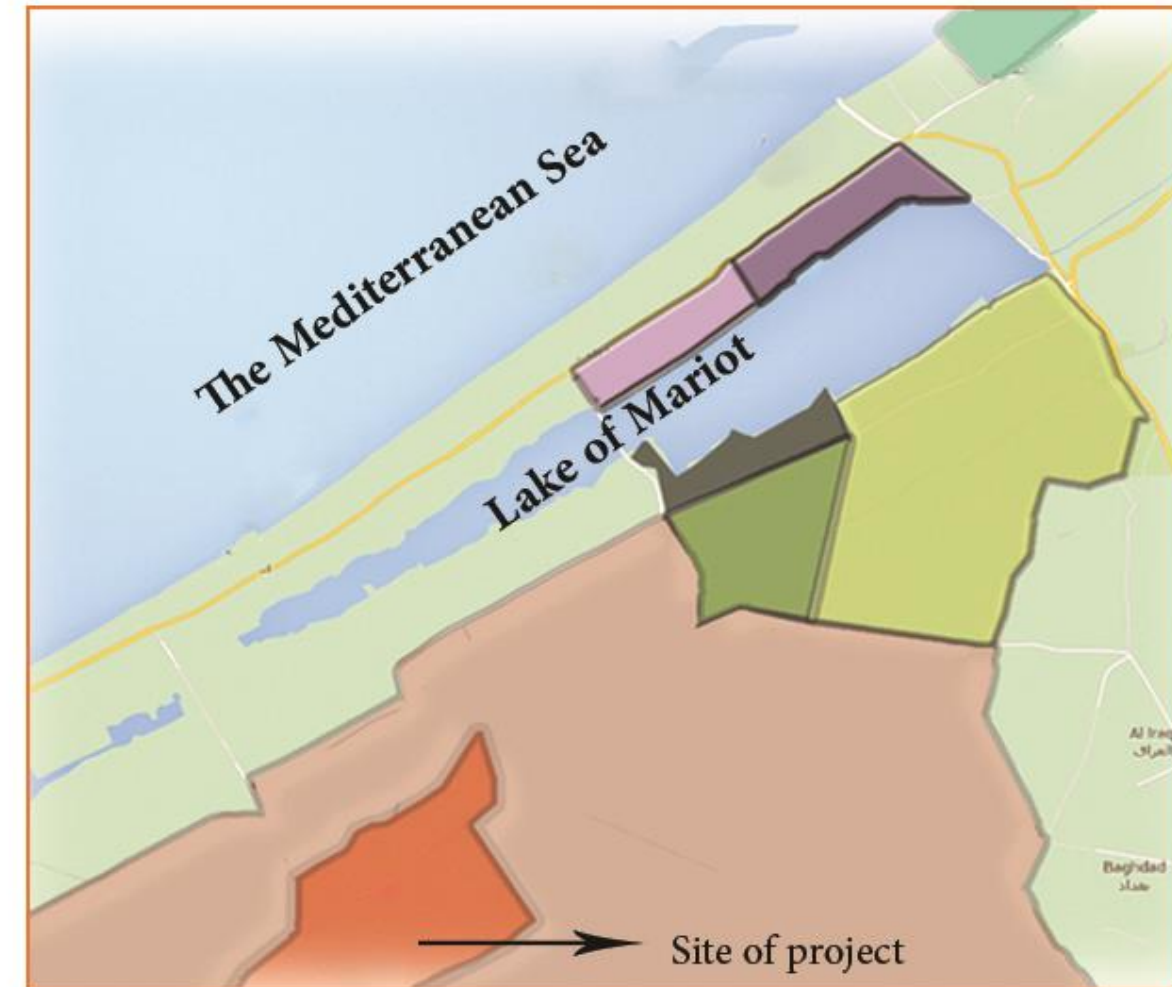


Figure 4 show surrounding areas

Information about the city

- Burg Al Arab is attracting city to investment due to its proximity to the tourist villages along the coast of the Mediterranean Sea , starting kilo 34 to the borders of the town kilo 61 .
- In addition existing anew Burg Al Arab city located south of city including factories and companies considered employment area attracting.
- The new Burg Al Arab city is tourist attractions because they have Archaeological Marimina monastery in the south of the city .

New Burj AL Arab City	Burj AL Arab
EL Agamy	EL Shaikh Mabrouk
AL Hawaryya	EL- Nasereya City
Qaryat Shakush	Sidi Kirayr

2.2 Project location

Train Station project
in Borg EL-Arab

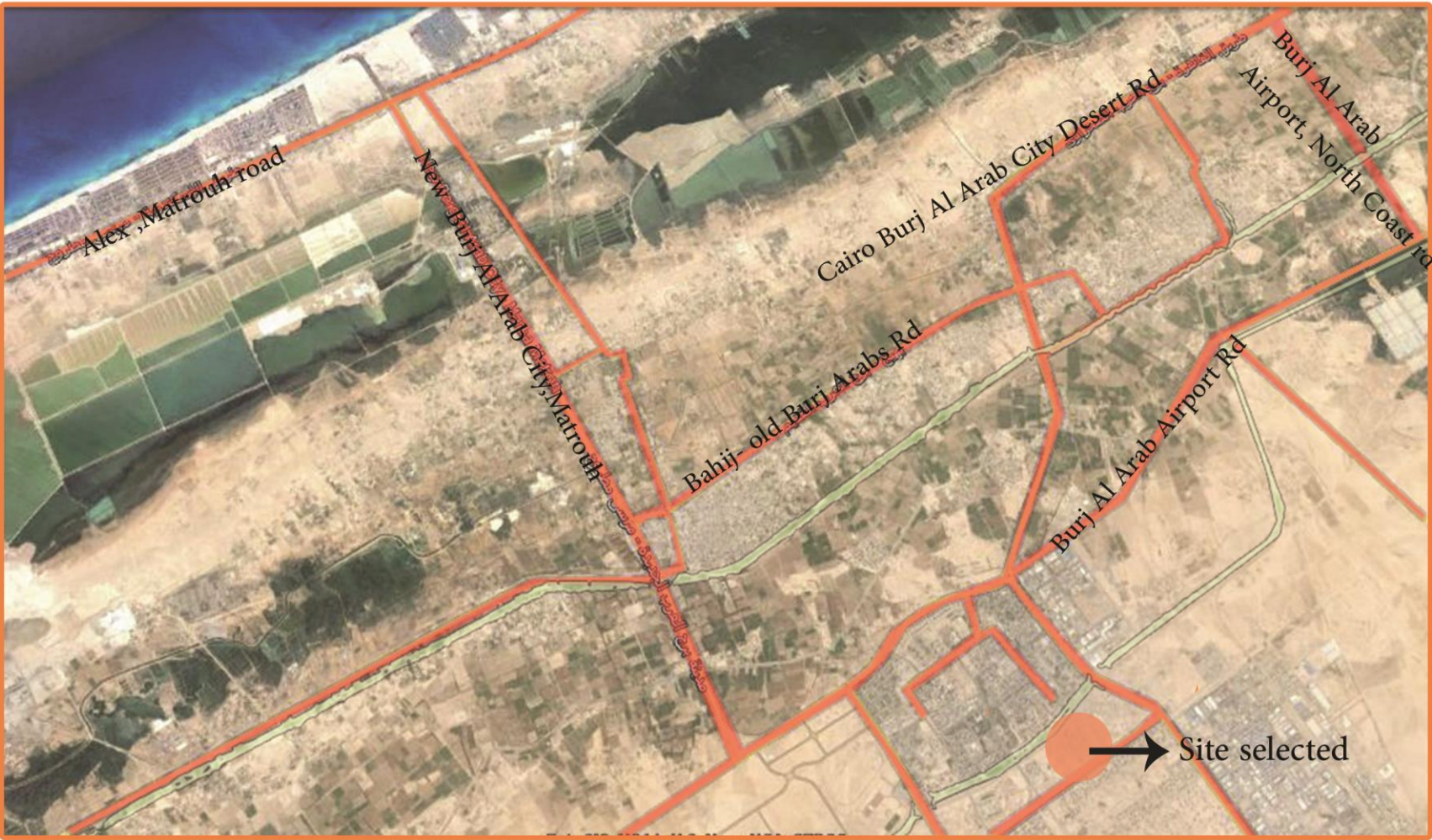


Figure 5

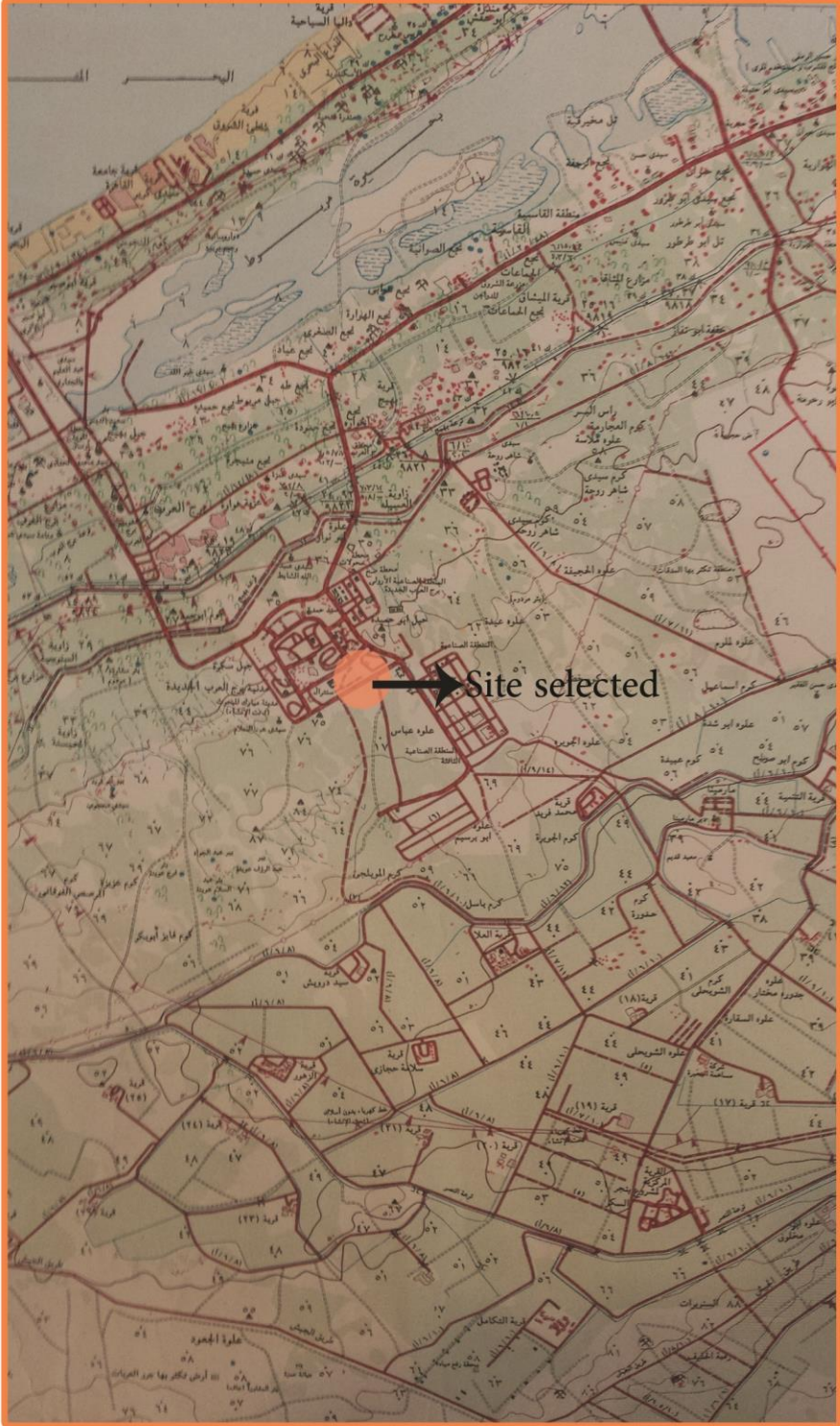


Figure 6

3. Site analysis

Train Station project
in Borg EL-Arab

Site selected area is : 50,000 m2

Soil type : rocky and sandy



Figure 7- show site analysis

Conclusion of sun directions

directing the building according to the sun movement over the building for a higher proportion of the temperature , it is determining the appropriate processors to solve the problems of climate .

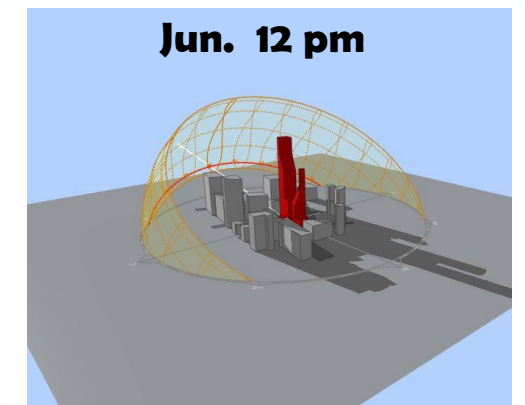


Figure 8

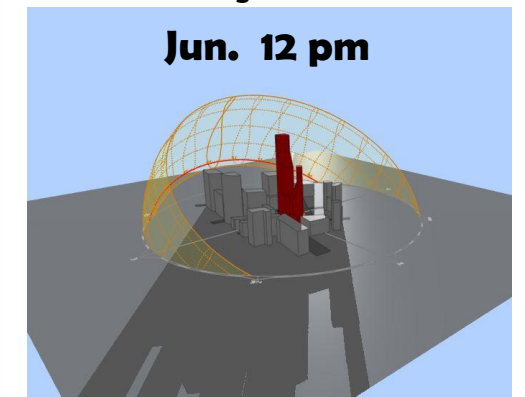


Figure 9

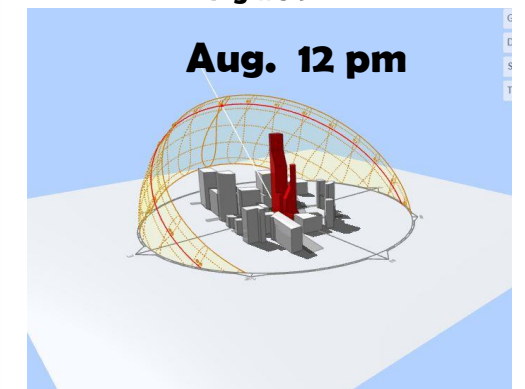


Figure 10

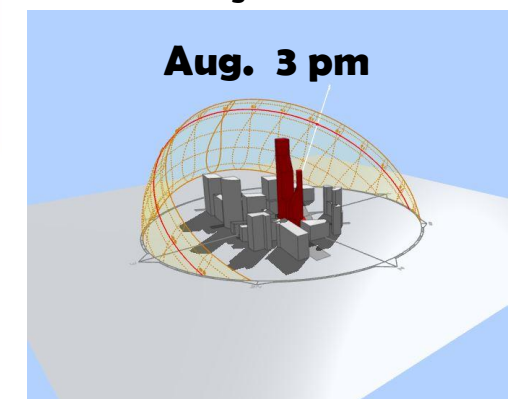
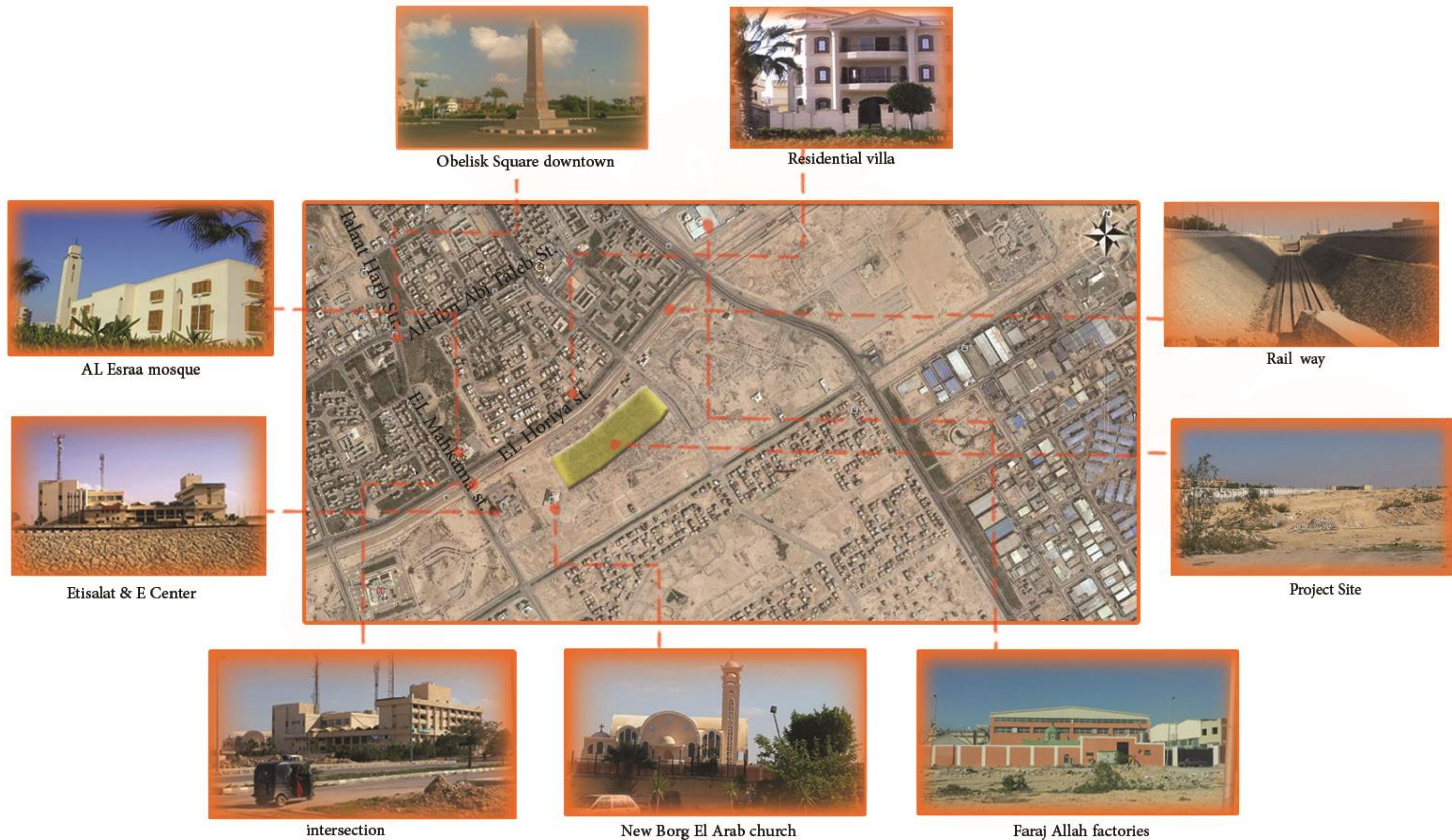


Figure 11

3.1 site plan

Train Station project
in Borg EL-Arab



3.2 land-use

Show the land-use



Figure 12

3.3 weather analysis

Average temperature

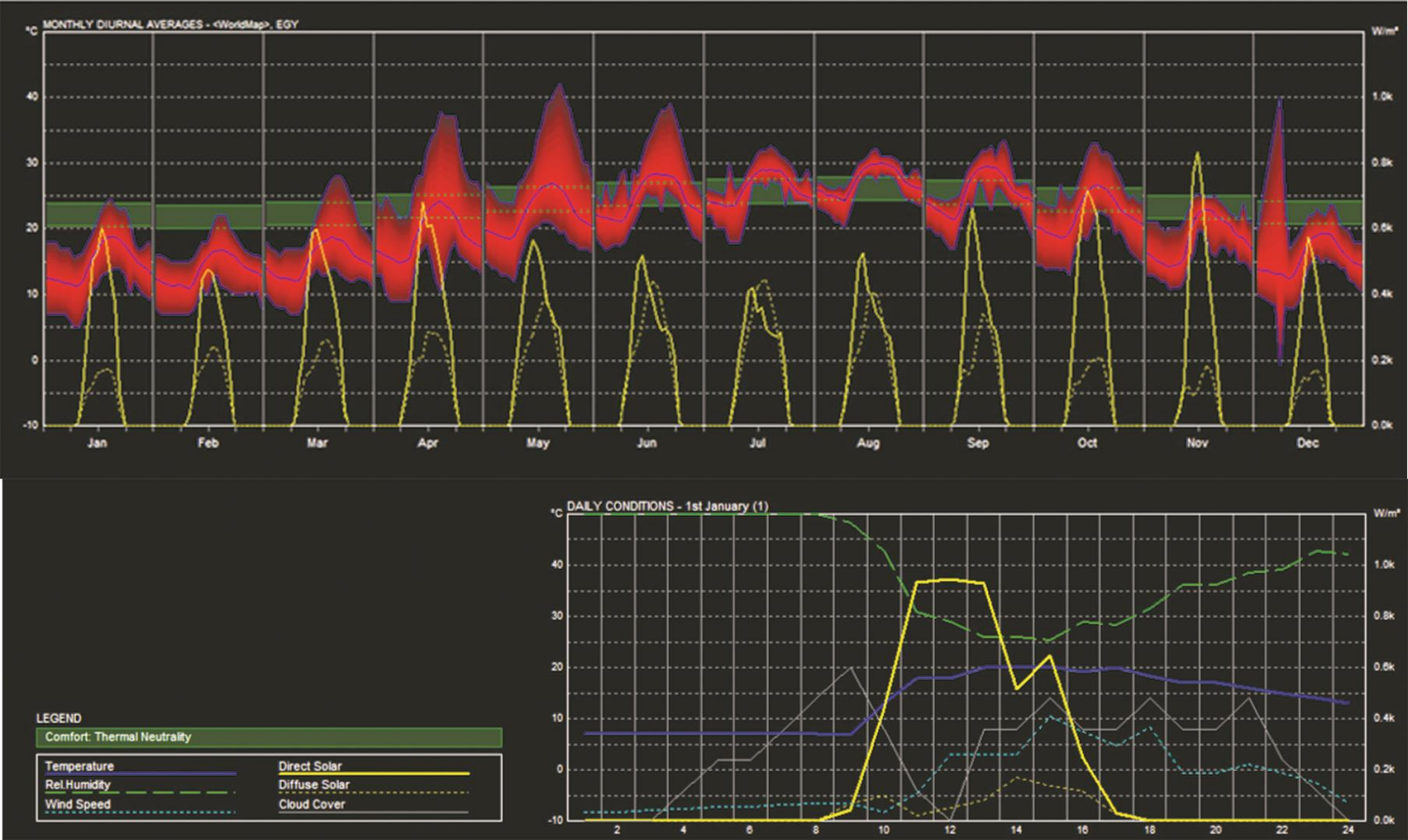
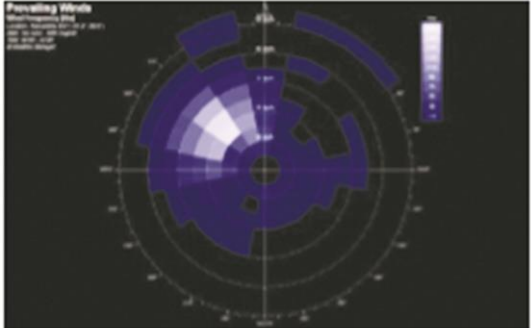


Figure 13 Figure shows average temperature, humidity, wind speed in Borg El-Arab

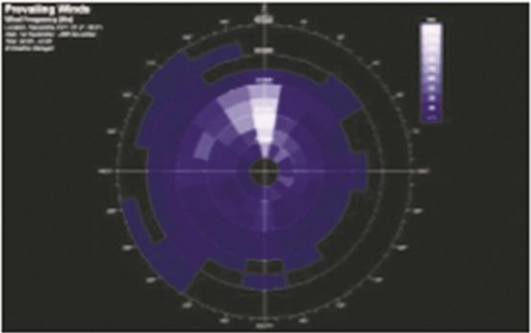
Conclusion

- The project is located nearly of Mediterranean sea where the wind speed as shown in the diagrams is high and it makes a force on the building so the design of the form must take in to account that force and deal with it by making it flexible to let the wind pass without any blocking.
- the highest temperature throughout the year could reach 45 ° C. and a lower reaches -3 ° C that define the material used to avoid high temperature or low it in all year round

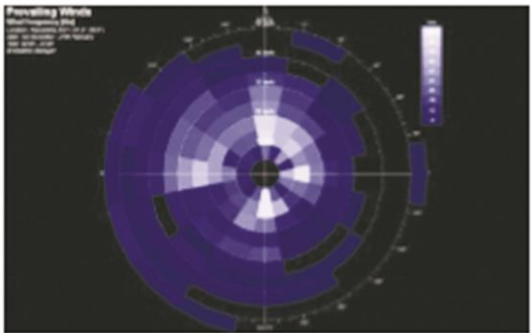
Wind analysis



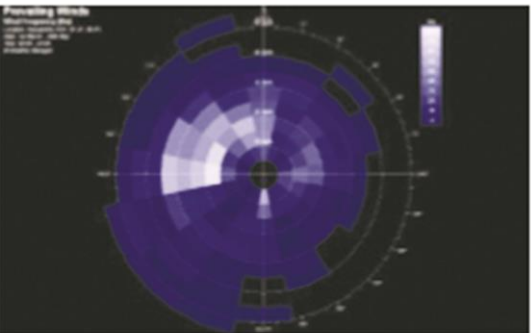
The prevailing wind in the Summer season.



the prevailing wind in the Autumn season.

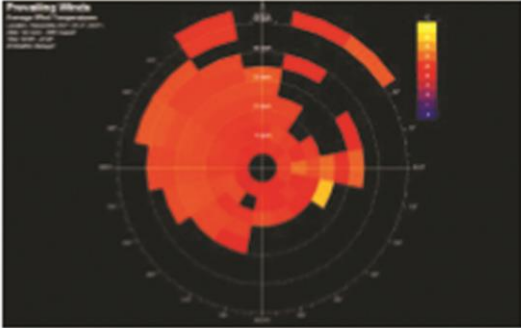


The prevailing wind in the Winter season.

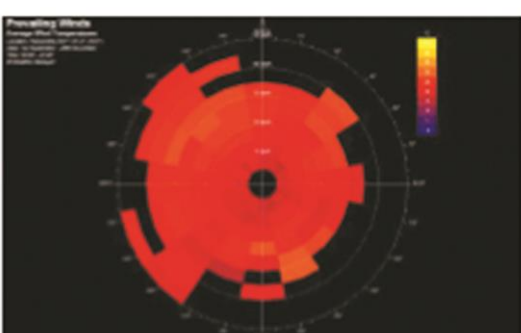


the prevailing wind in the Spring season.

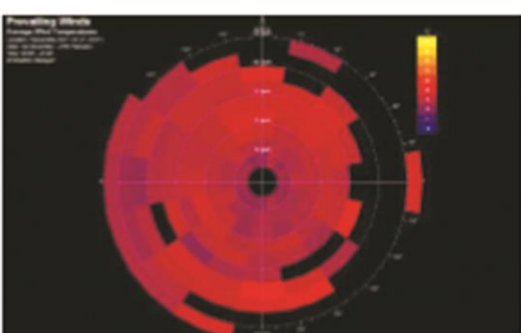
Temperature analysis



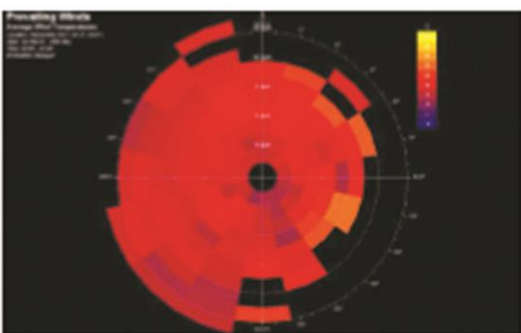
The rate of temperature in the Summer season.



The rate of temperature in the fall season



The rate of temperature in the Winter season.



The rate of temperature in the Spring season.

4.1 Example 1

Train Station project
in Borg EL-Arab

Architect Calatrava
Location France
Total area 8650m²

Concept of design

Calatrava said "I never thought of a bird, more of the research that I am sometimes pretentious enough call sculpture", which he's inspired more by human body- human eyes".



His inspiration- Human eyes

Buiding Orientation



form the supports for mechanically operated louvers that naturally ventilate the station at the clerestory level.



Site Plan Diagram

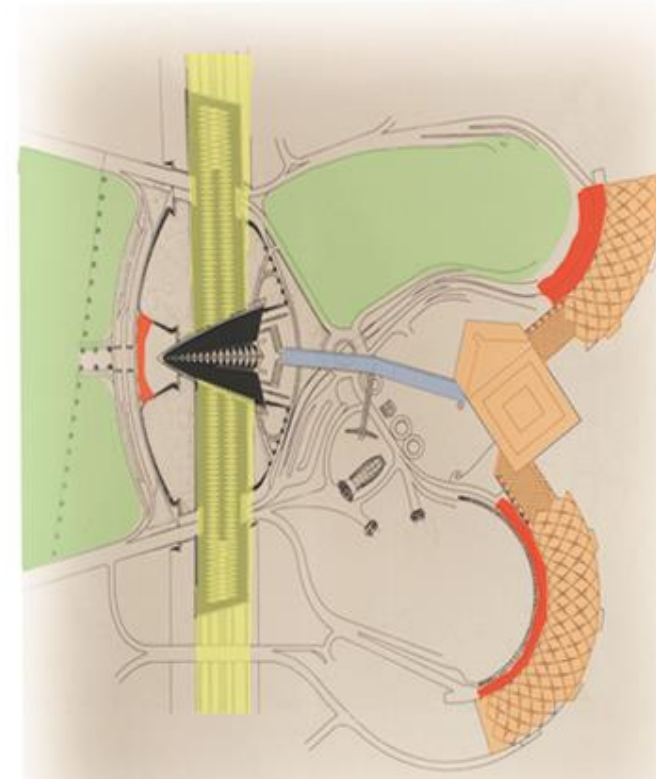


Figure 14

- Pedestrian Connector
- High Speed Rail
- Airport
- Dropoff
- parking

OVERVIEW

- Lyon-Satolas Airport (now Saint Exupéry) Railway Station
- Lyon, France
- Built between 1989-1994
- Architect: Santiago Calatrava

OVERVIEW: DESIGN SPECS

- Main span: 100 meters
- Width: 100 meters
- Height: 39 meters
- Total Length: 450 meters
- Area: 5,600 square meters

The main hall accommodates

ticket offices, retail shops, restaurant facilities and access to and from the airport via a 180 meter long gallery.

- The station has six tracks. The two central tracks are isolated to permit trains to pass through the station
- Above the tracks, a 300 meter long passenger concourse allows for easy access to the platforms.



Figure 2.24 Lyon-Satolas TGV railway station, France, designer: Santiago Calatrava. 120 m long, 100 m wide, 40 m high structure.

Main Elevation



The design exploits the dynamic qualities of curved concrete arches, presenting the structural clarity of a skeleton, complete with ribs and vertebrae that provide a primary language for bridges canopies, enclosures and circulation routes.

Materials



platforms extend symmetrically from the center of the main concourse axis. These are roofed by a diagonally ribbed vault which is sheathed in aluminum and broken by a series of glazed diamonds that permit natural daylight to filter to the station's platforms.

4.1 Example 1

Train Station project
in Borg EL-Arab

Peripheral area



Main Hall



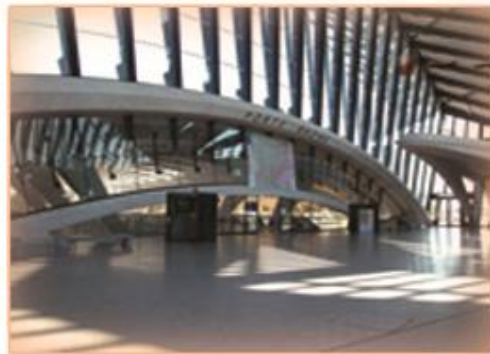
Station Hall



Entrance of mechanical services&shops areas



Hall entrance



The expressive signature roof, which soars 40 meters above the booking and ticket area in an arched vault cantilevers over the outer arches resting on the two inner arches.



These two inner arches which form the entry points to the station platforms are symbolic gateways.

Main Entrance



Airport entrance



the main entrance rests the main service building nick-named the "backpack", complete with a large awning in the rhythm of the vaulted wings and yields the pedestrian connection to the airport itself.

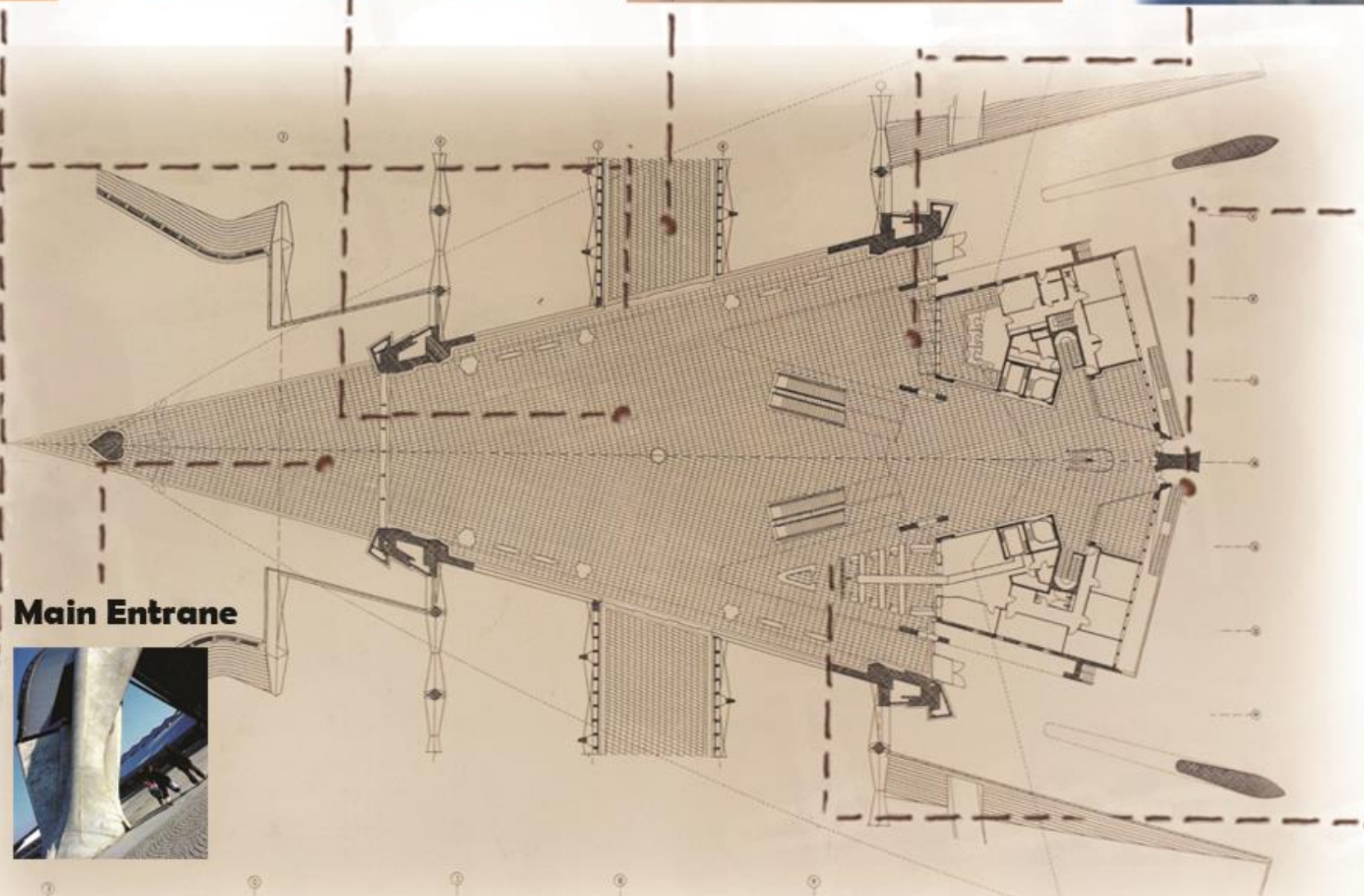


Figure 15 Show Ground floor plan

The expressiveness of Calatrava's structure is seen inside the building as much as outside with two large cantilevered balconies that penetrate the interior space.

4.1 Example 1

Train Station project
in Borg EL-Arab

Spaces diagrams

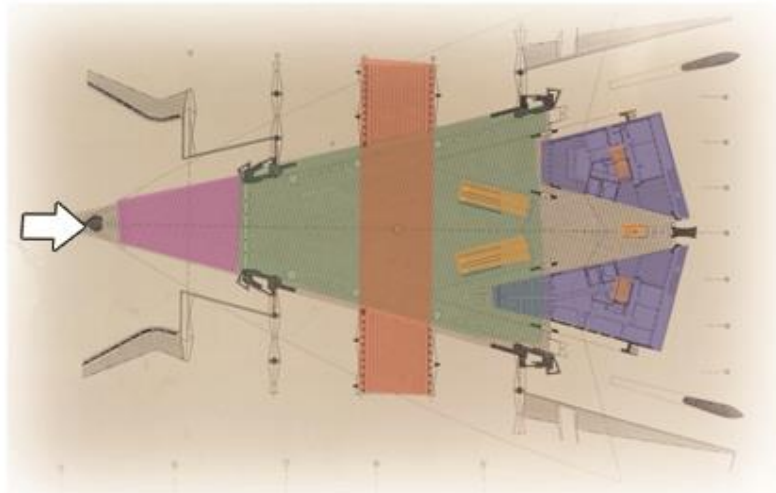


Figure 16 Ground Floor

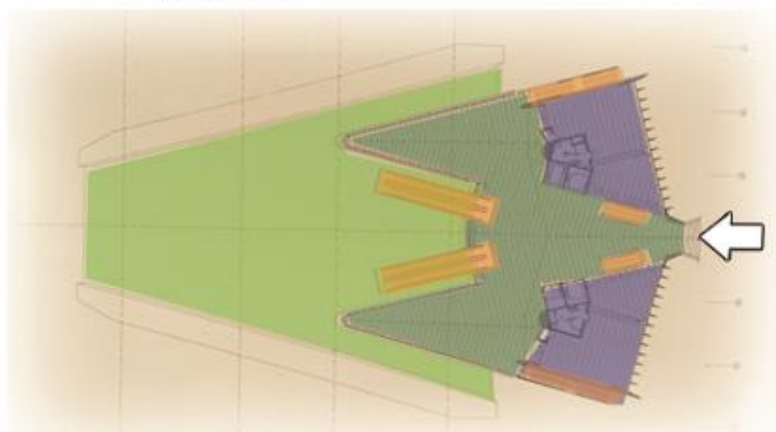
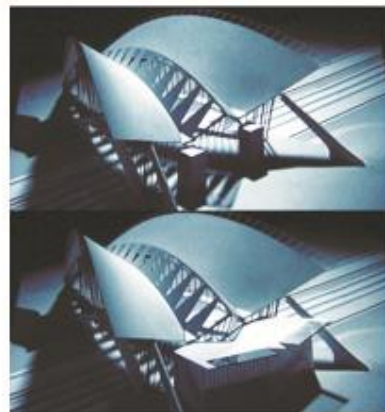


Figure 17 Upper Floor

- Services
- halls
- Vertical Circulation
- Platform
- Entrance Space
- Atrium



Natural light

Calatrava developed a motif designed not only to permit the natural light to pass into the lower platforms. but to give expression to the static nature of the station in contrast to the real motion of the passing TGV train This motif would be repeated through out the entire lower concourse so that a lattice work of concrete bracing appears light as with Nervi's concrete vaults, and this creates the illusion of the supporting structure dissolving into the landscape.

Zones diagram

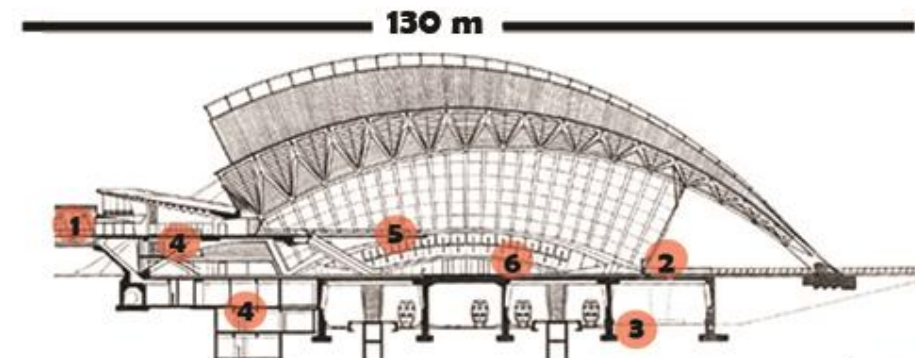
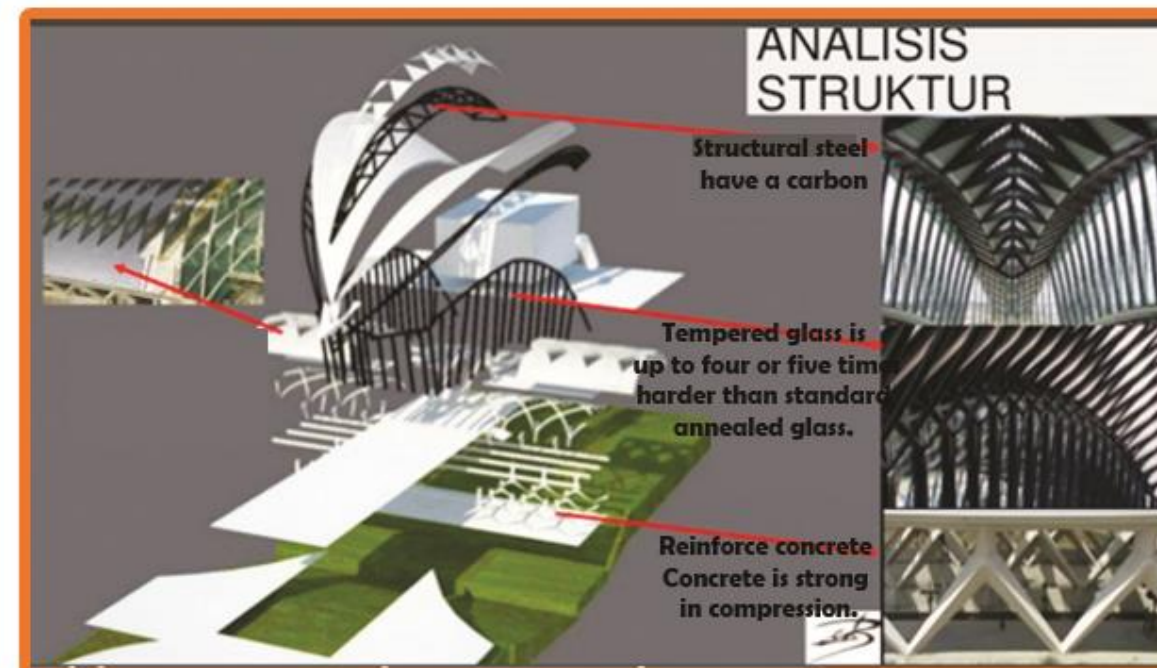


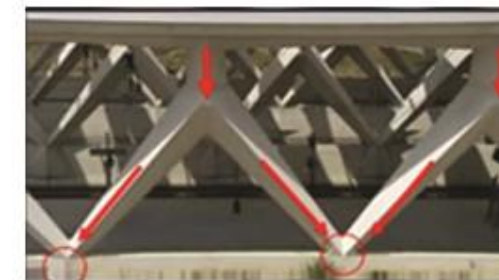
Figure 18 Cross section

- 1 Entrance From Airport
- 2 Main Entrance
- 3 Platforms & Tracks
- 4 Services in Splet level
- 5 Large Cantilevered
- 6 Arrival & Departote Hall Coverd



Structure concept diagram

section of main hall skeletal structure is bent, it has gravity load acting towards ground. Its inertia resist it from being moved and tend to return to its original shape.



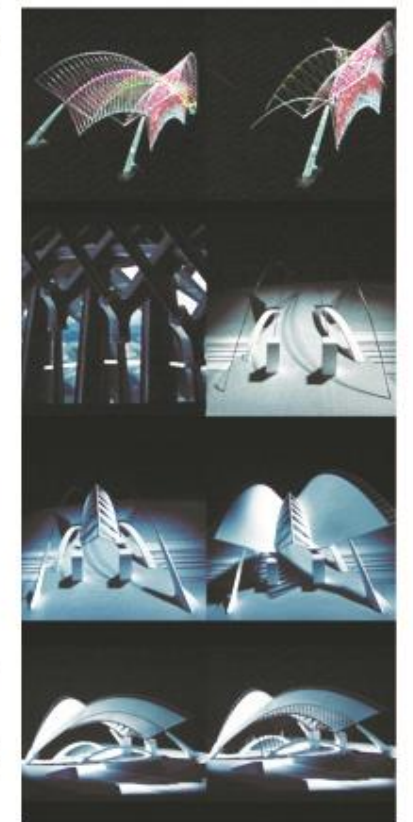
The distribution of loads



- Using a mixture of white concrete worked like clay, black painted steel with expressive struts Calatrava creates 2 primary arches to span the main concourse.

- 2 large steel arches on the outer banks of the concourse: and 2 inner steel arches supported by massive concrete piers.

- 25 steel beams, comprising a total of 600 steel bars that make up the entire structure and of which only 2 are vertical further Connect these.



4.2 Example 2

Architect Calatrava
Location Belgium
Total area 160629.6m²

Concept Of Design

Calatrava aimed to enhance this permeability by creating a building without facades, was transparency and an urban dialog with the city, relying on the roof for shelter and the building's identity.



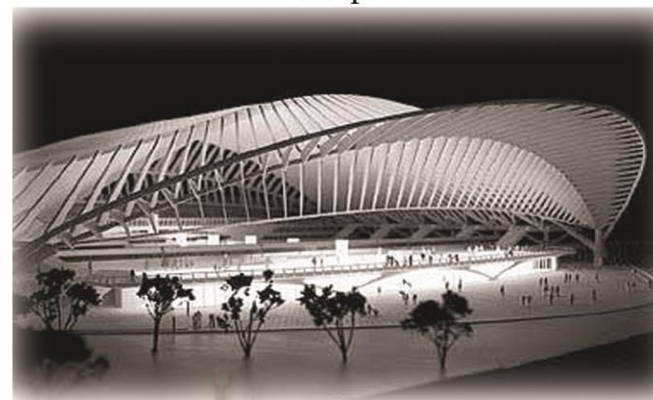
The huge glass building interaction between the interior of the station and the city.



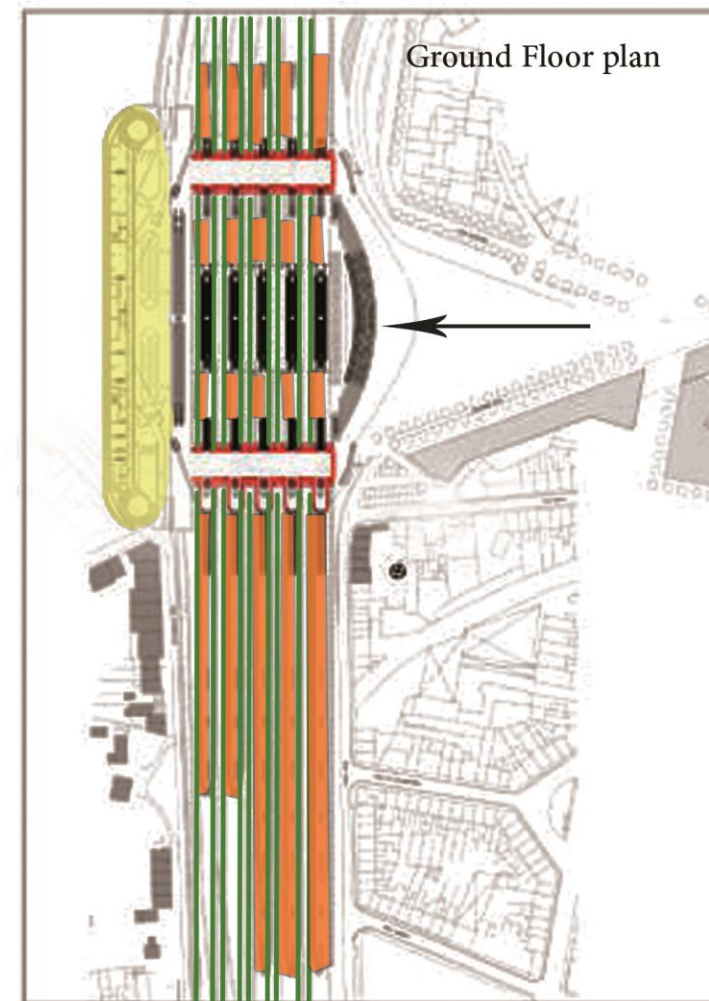
Site plan



The vaulted shape was a natural development of this vision while the soft undulating curve of the roof was selected to mimic the graceful rise and fall of the Cointe hills beyond .



Model photo courtesy Santiago Calatrava



Ground Floor plan

5 platforms (three of 450 m and two of 350 m).

9 tracks

The Pont des Guillemins, connects the motorway that crosses Liège to the 800 space parking facility at the Liège Guillemins TGV Station.

Overview

- Liège-Guillemins railway station is the main station of the city of Liège, the third largest city in Belgium. It is one of the most important hubs in the country and is one of the 3 Belgian stations on the high-speed rail network.
- Use 36,000 people every.

History Of Project Site

- In 1838, only three years after the first continental railway, a line linking Brussels and Ans, in the northern suburbs of Liège, was opened. The first railway station of Liège-Guillemins was inaugurated in May 1842, linking the valley to the upper Ans station. In 1843, the first international railway connection was born, linking Liège to Aachen and Cologne.
- This station was replaced in 1958 by a modern (for that time) one that was used until June 2009, a few months before the opening of the new Calatrava designed station.

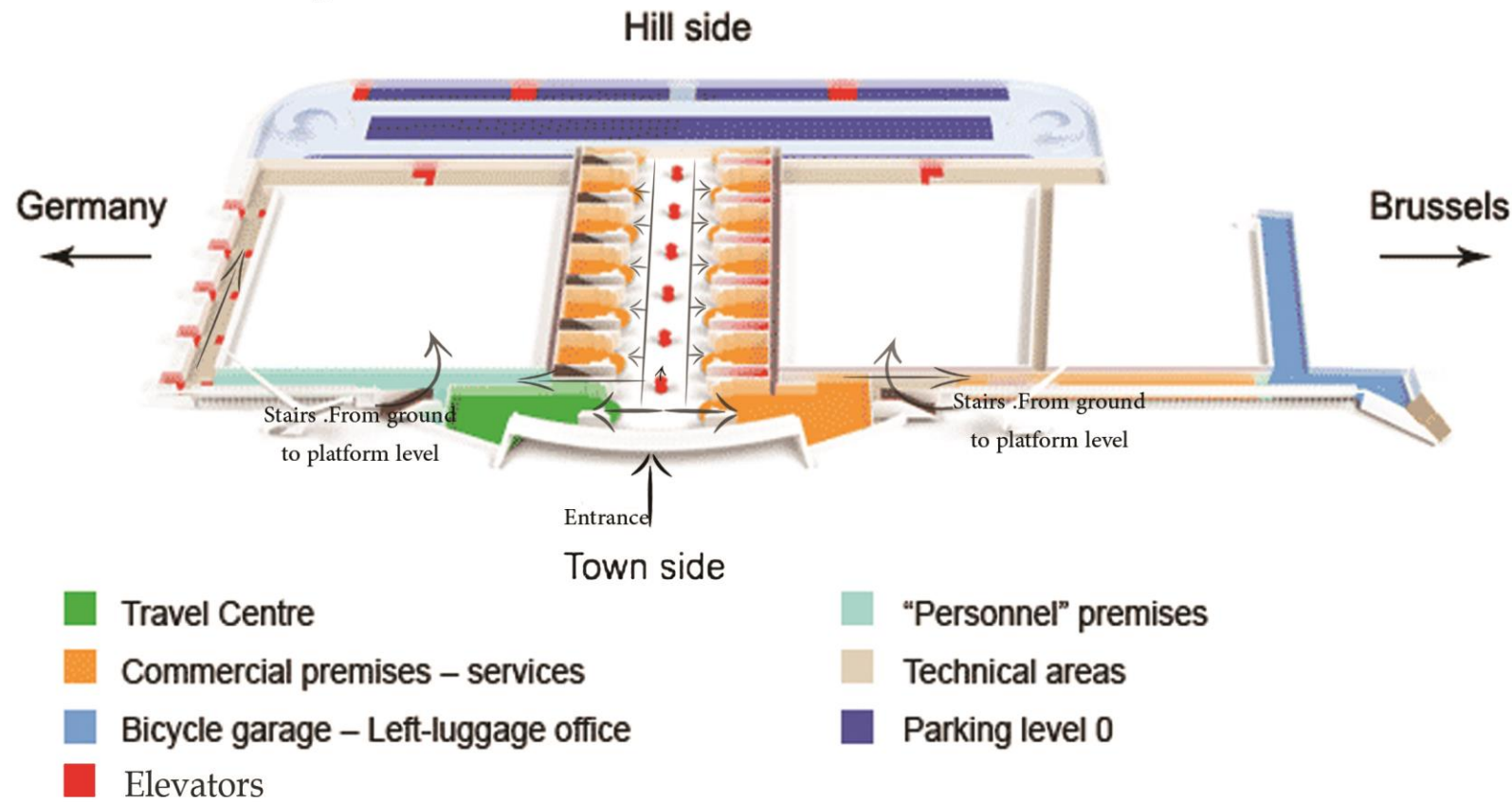


- Called Liège-Guillemins station, the project links two areas of the city previously divided by railway tracks.

4.2 Example 2

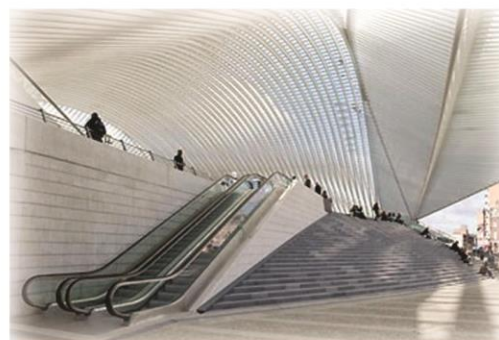
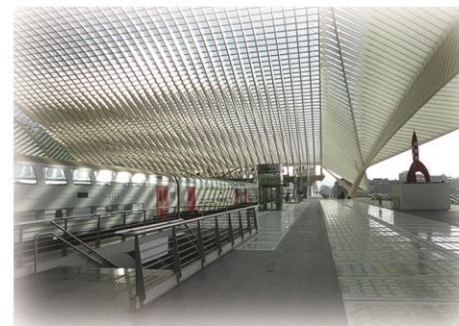
Train Station project
in Borg EL-Arab

"Grand Gallery" level



Entrances

- The station is entered on the grand gallery level from the town.
- Fixed stairways, ascending and descending escalators and lifts give access to the platforms from the grand gallery.
- Coming from the square in front of the station, the first platform can be reached directly by the monumental stairs that start on either side of the entrance, or by the lateral escalators. Once on this platform, the other platforms can be reached via one of the two footbridges.



The entrance station, on the town side



The grand gallery



Access to the first platform via the stairs and the escalator



The travel center



The grand gallery

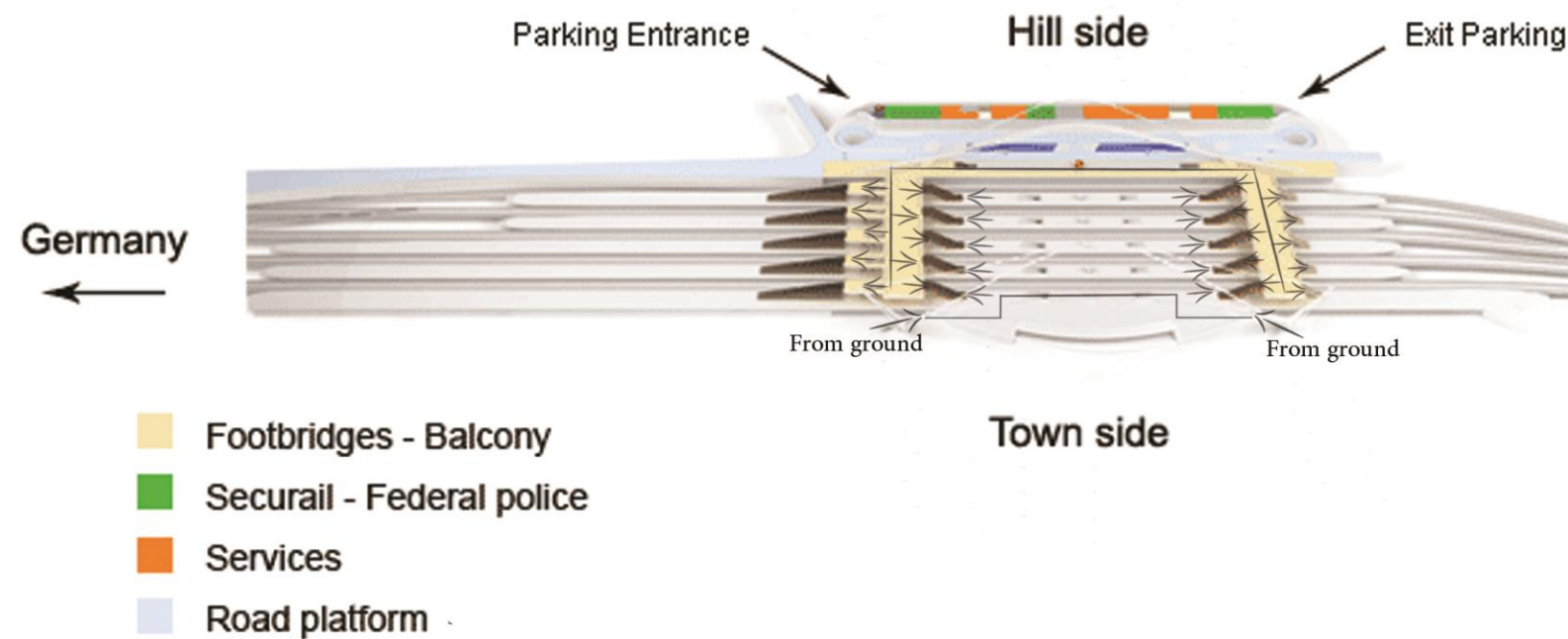


Behind the portico columns, the commercial area, the bicycle garage and the left-luggage office

4.2 Example 2

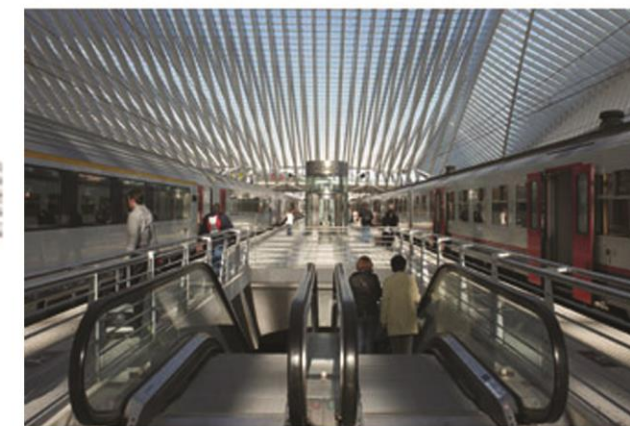
Train Station project
in Borg EL-Arab

"Platforms" level



From the platforms, inclined travelators can be used to reach the footbridge on the Germany side.

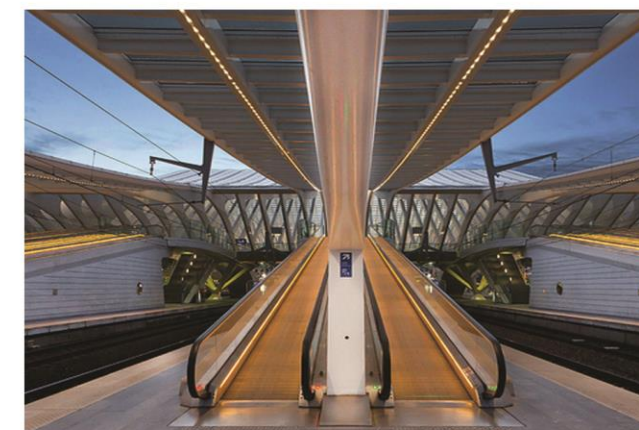
There are premises for the staff as well as technical rooms on the "platforms" level as well as on the parking level 1.



Escalators to grand gallery



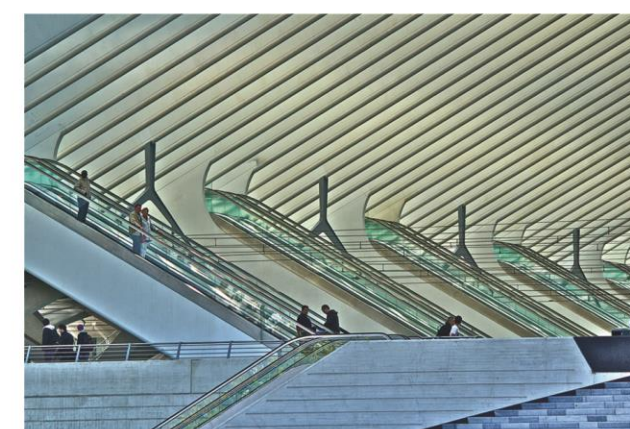
Platforms level



The travelators that link the platforms and the footbridge



Tracks



Escalators to Footbridges-Balcony



The stairs that link the platforms and the footbridge

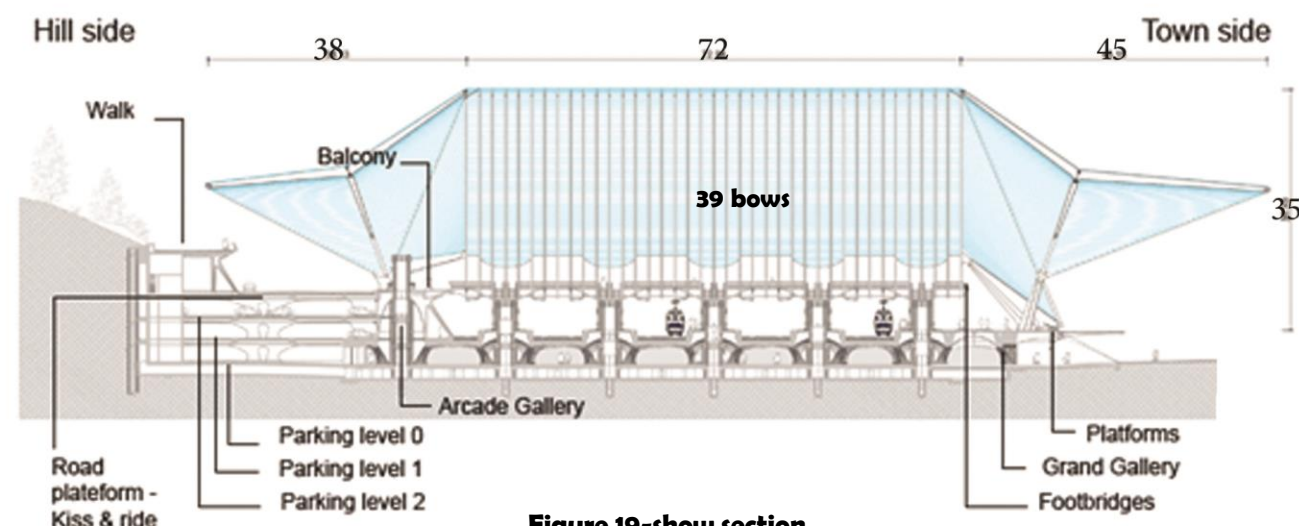
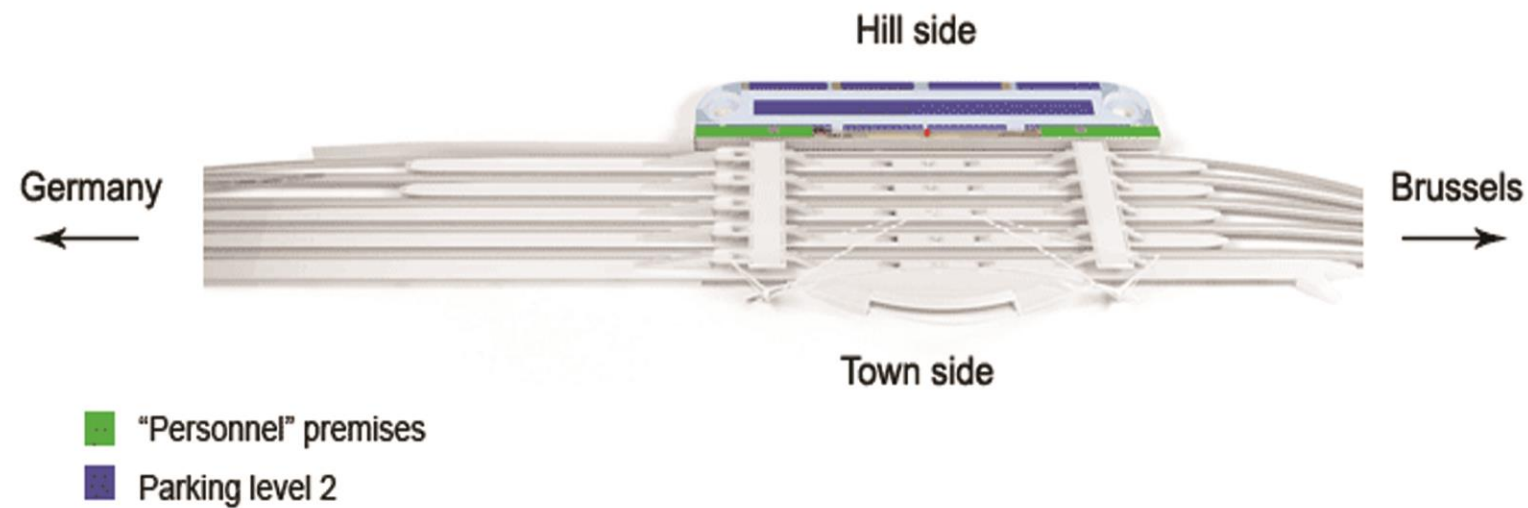


Figure 19-show section

4.2 Example 2

*Train Station project
in Borg EL-Arab*

Parking level 2



This level can be accessed from the arcade gallery, which serves as the interface between the station proper and the different parking levels, by taking the escalators, the stairs or the lift. It is also possible to go down to it from the balcony.

There are premises for the staff on this level as well. personal premises.

Escalators on the platforms lead to a mezzanine that accesses the hilly parkland behind the station.

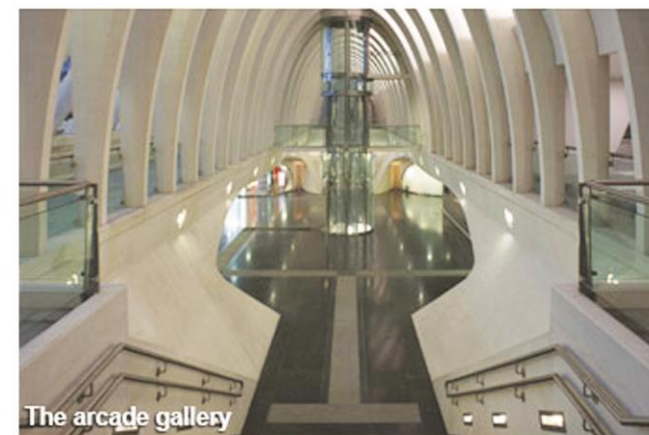
Two stormwater basins have been burried beneath.



The section seen from the balcony



The arcade gallery



The arcade gallery down to parking



parking



4.2 Example 2

Train Station project
in Borg EL-Arab

"Footbridges Road platform Balcony" level

Two symmetrical footbridges span the tracks and can be used, from the road platform and the pick-up/drop-off area situated on the hill side, to reach the platforms via the fixed stairways, the escalators and the travellers (for the footbridge on the Germany side).

Leaning against the hill, and separated from the station by the road platform, the light structures play host to various services.

Natural light

Calatrava developed a motif designed not only to permit the natural light to pass into the platforms.

Materials **Steel, Concrete & glass**

The metal frame of the glass roof covering the whole station is composed of two parts: the first and more important part is the station itself and the second one platform shelter.



covers the tracks and the new infrastructure essentially realized with white concrete.



Natural ventilation



One of the tow footbridges



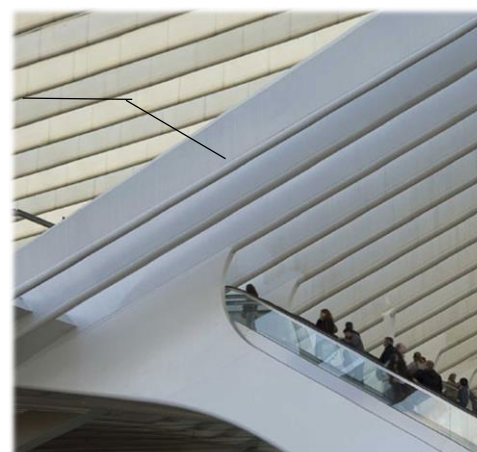
On the right, the building leaning against the hill



The bridge giving access to the rood platforms



La promenade qui coiffe le bâtiment adossé à la colline



Concrete arched



Dome long 200 m made up
Steel & glass

4.3 Example of circulation

Train Station project
in Borg EL-Arab

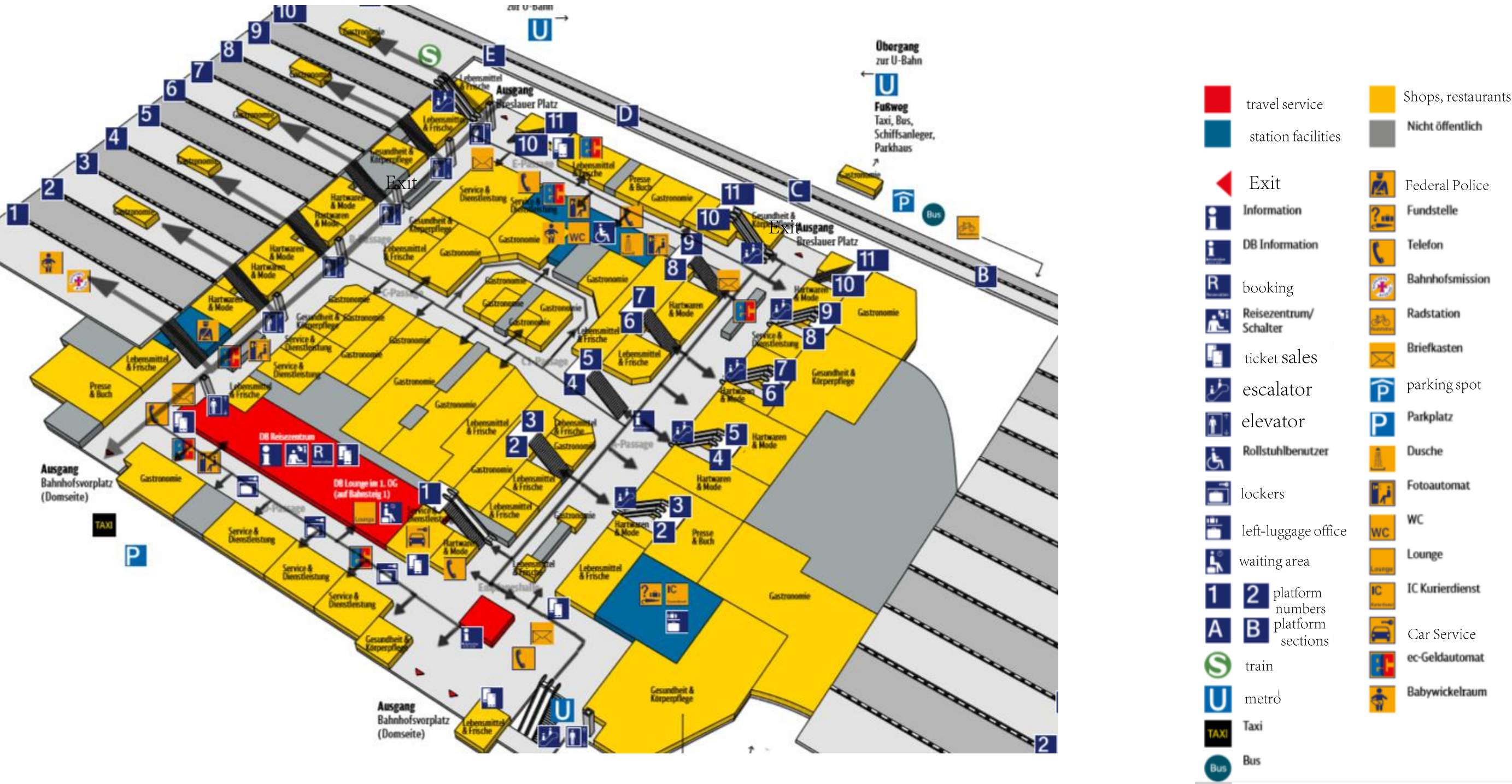


Figure 20

اولا : يجب التأكد من توافر جميع شروط ووسائل السلامة في جميع المباني والمخازن والقطارات واختبار ، وذلك عن طريق فحصها ، والقضبان الحديدية كفاءتها وصلاحياتها للاستخدام وعمل جميع الترميمات والإصلاحات اللازمة وعدم استخدام أي منها في حالة الخلل

ثانيا : يجب فحص معدات السلامة والإنقاذ والإسعاف والإطفاء في المحطات والقطارات والمخازن بصفة دائمة ودورية وصلاحياتها وذلك للتأكد من سلامتها .

ثالثا : يجب تدريب جميع العاملين في القطارات والمحطات والمخازن على كيفية مواجهة ، الحوادث والظروف الطارئة والاستخدام الصحيح لوسائل السلامة والإنقاذ والإسعاف والإطفاء ويجب أن يكون التدريب في إحدى المدارس أو المعاهد الوطنية ا لمتخصصة والمعتمدة من المديرية العامة للدفاع المدني

رابعا : :إل يجب على مسئول السلامة وضع لوحات رشادية وتحذيرية في مكان بارز من كل عربة وأي ، وتكون هذه اللوحات مكتوبة بخط واضح وباللغة العربية والإنجليزية ، من عربات القطر والطريقة المثلى للتحرك داخل ، بحيث تشمل تلك اللوحات تحديد أماكن الخطورة ، لغات أخرى وأوقات الحوادث و ، القطارات في الأوقات العادية الطوارئ وتوضح كذلك كيفية استخدام الجمهور لوسائل السلامة والإنقاذ والإطفاء المتوفرة .

منشآت المحطة

١. يجب تصميم محطات الخطوط الحديدية بحيث تتوافر فيها جميع متطلبات السلامة الواردة في هذه اللائحة، ويجب أن تشيد المباني من مواد غير قابلة للاشتعال .
٢. بحواجز مقاومة للحريق ، يجب أن تكون غرف الكهرباء الفرعية معزولة عن بقية المباني لمدة ثلاثة ساعات على الأقل سابقاً . ومزودة بأبواب مقاومة للحريق .
٣. يجب أن تكون أماكن الخطورة معزولة عن باقي المحطة بحوائط مقاومة للحريق لمدة ساعتين . وأبواب مقاومة ، وهذه الأماكن تشمل غرف أجهزة ، للحريق لمدة ساعة ونصف على الأقل التحكم في القطارات - غرف البطاريات - غرف لوحات الكهرباء - أماكن تجميع النفايات . وغيرها،

تجهيزات مكافحة الحريق بالمحطة

يجب (بالتنسيق مع اقرب اداره، او مركز دفاع مدني) تحديد وزن و عدد ونوع طفايات الحريق اليدوية اللازمة لحماية محطة الخطوط الحديدية وأماكن وضعها والتدريب على استعمالاتها مع مراعاة ألا تزيد المسافة بين أي طفاية وأخرى على (٣٠) متر كمي يجب تجهيز كافه إرجاء المحطة بشبكة أنابيب لمياه الإطفاء يركب عليها بكرات خرطوم طولها من ٢٠-٣٠ مترًا وقطر من ١-١,٥ بوصة تغذي من مصدر مياه تحت ضغط مناسب على أن تخصص بكرة بخرطوم لكل مسافة ٣٠٠ متر مربع من الموقع .

سبل النجاة

يجب توافر مخارج الطوارئ اللازمة لإخلاء جميع الركاب من المحطة في حالات الطوارئ خلال فترة أربع دقائق ويجب ألا تزيد أقصى مسافة يقطعها الشخص للوصول إلى المخرج من أي مكان على الرصيف عن ٩١,٤ متر كم يجب ان تفتح جميع مخارج الطوارئ في اتجاهات متعددة وأن يؤدي جميعها إلى خارج المحطة ، وإلى مكان يتوافر فيه الأمان ، والسلامة والهواء الطلق وأن تكون جميع أبوابها سهلة الفتح للخارج مع تمييزها ب لافتات واضحة مضيئة .

الإضاءة والتديدات والتجهيزات الكهربائية

- ١ - يجب أن تكون ة والتديدات والتجهيزات الكهربائية من الأنواع المعتمدة والمطابقة لمواصفات الهيئة العربية السعودية للمواصفات والمقاييس.
- ٢-يجب تزويد محطات الخطوط الحديدية بنظام إضاءة للطوارئ يغذي من مصدر احتياطي مستقل عن مصدر الكهرباء الرئيسي.
- ٣- يجب أن يشمل نظام الطوارئ كافة كيبات الإضاءة الخاصة بالمخارج وطرق النجاة لضمان استمرار إنارتها عند انقطاع التيار الكهربائي الرئيسي.
- ٤ . يجب تصميم إضاءة الطوارئ على الدرج والسلالم الميكانيكية بحيث تتركز الإضاءة على أعلى الدرج وأسفله.

الإطفاء

يجب تدبير المورد المائي اللازم لأعمال مكافحة الحريق مع تركيب خزان مياه أو أكثر يزود بمكينات الضغط المناسبة لإمداد شبكة مياه الإطفاء بكميات المياه اللازمة وب الضغوط المناسبة لتغذية حنفيات الحريق وتوصيلات بكرات الخرطوم ونظام الإطفاء التلقائي .

التلقائي أنظمة الإنذار الآلي والإطفاء

- ١- يجب تجهيز المستودعات بنظام الإنذار الآلي(الدخان) أو، رؤوس كاشفة للحرارة وكذا بنظام الإطفاء الآلي باستخدام الرشاشات الأتوماتيكية وأن يتم ربط النظامين بغرفة المراقبة والاتصالات.
- ٢- و يتم اختبار أنظمة الإنذار لإطفاء الآلية المناسبة بعد دراسة الموقع بمعرفة جهة فنية متخصصة على أن يكون التصميم والتركيب طبقاً للمواصفات الفنية المعتمدة من الهيئة العربية السعودية للمواصفات والمقاييس.

Core Area

Entrance area
Tickets area
Ticket machine
Information desk
Waiting hall
Arriving
Emergency Exit
First Aid
Mechanical room

Administration

Office station Manager room
Meeting room
Cash counting office
Communication room
Controlling room
Lost bags room
Storage bags room
Cleaner room
Archive room
Staff locker room
Staff Meal Room
Toilet

Services

Cleaning machine room
Cleaner room
locker room
Meal Room
Toilet

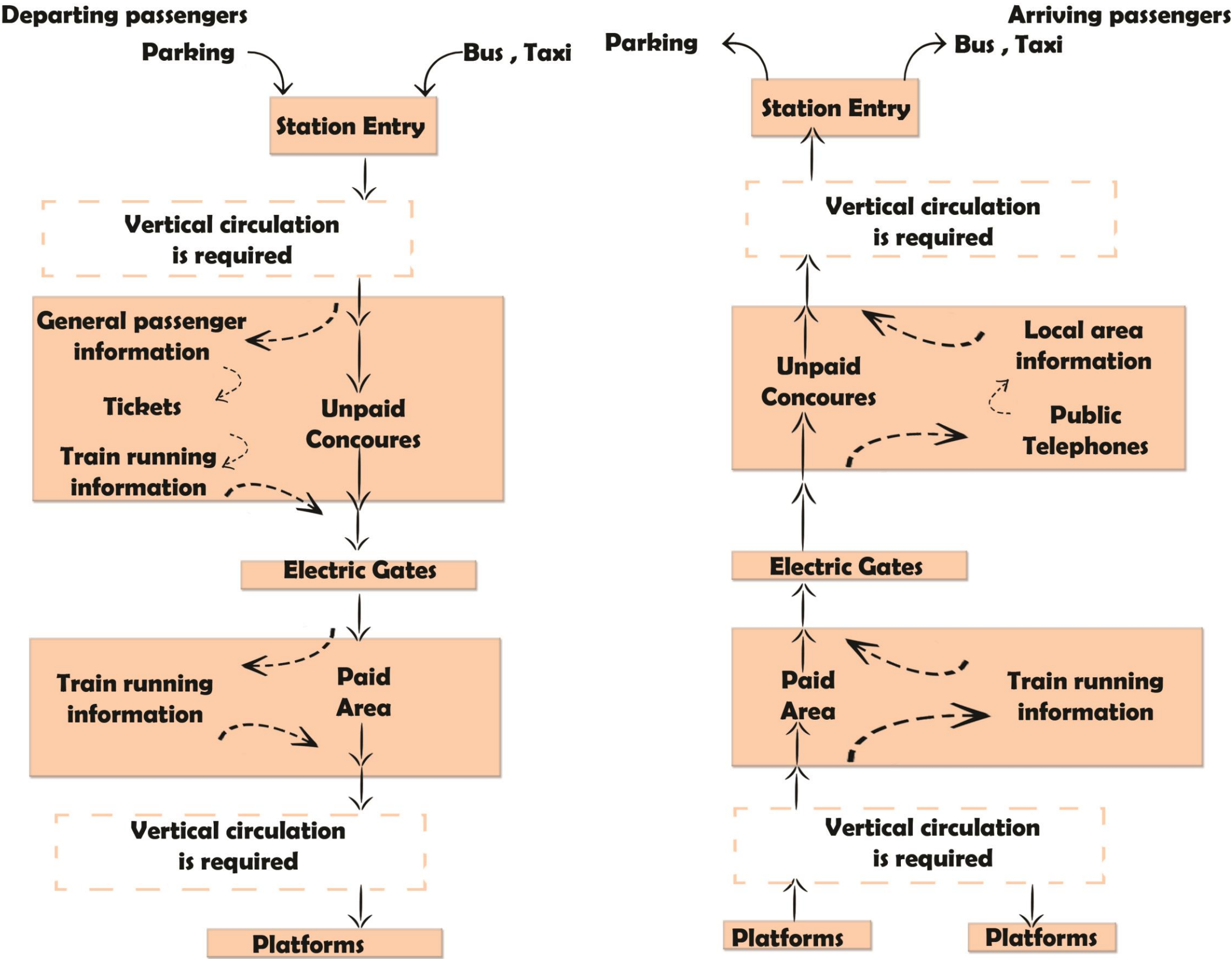
Transit Area

Shopping area
Toilets
Public Telephone
Restaurant
Court
Cafeteria
Rest room
pharmacy
Information desk

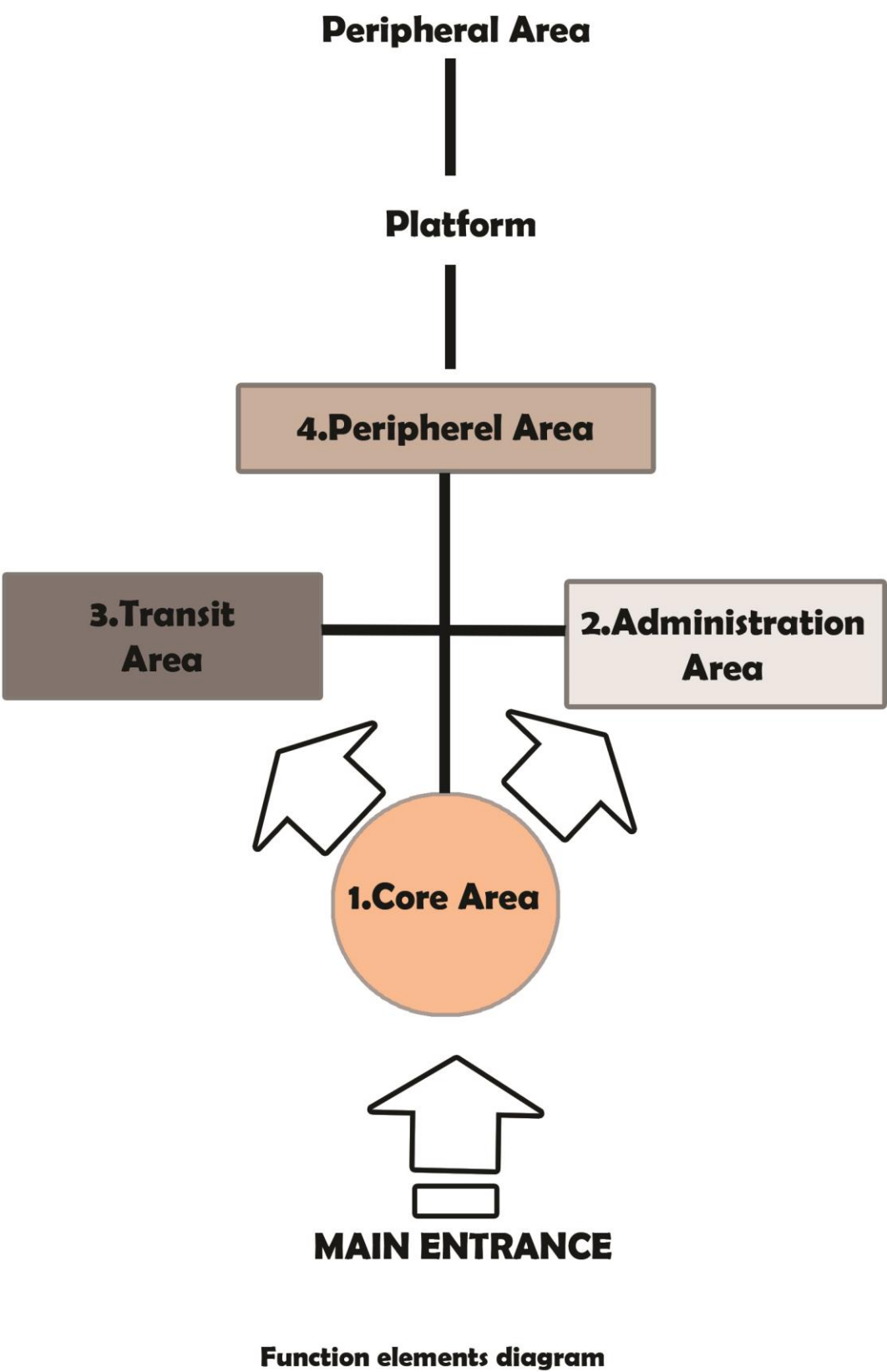
Peripheral Area

Plat Forms
Tracks
Maintenance & operational
Arrivals & Departures hall
Kiosks
Ticket barriers
Stairs and bridges

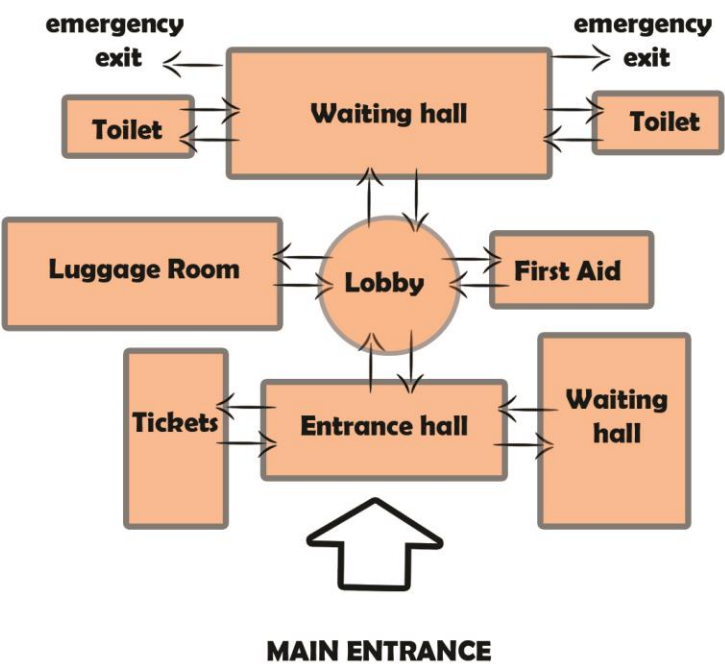
6.1 circulation diagram



6.2 diagrams of functional & circulation elements

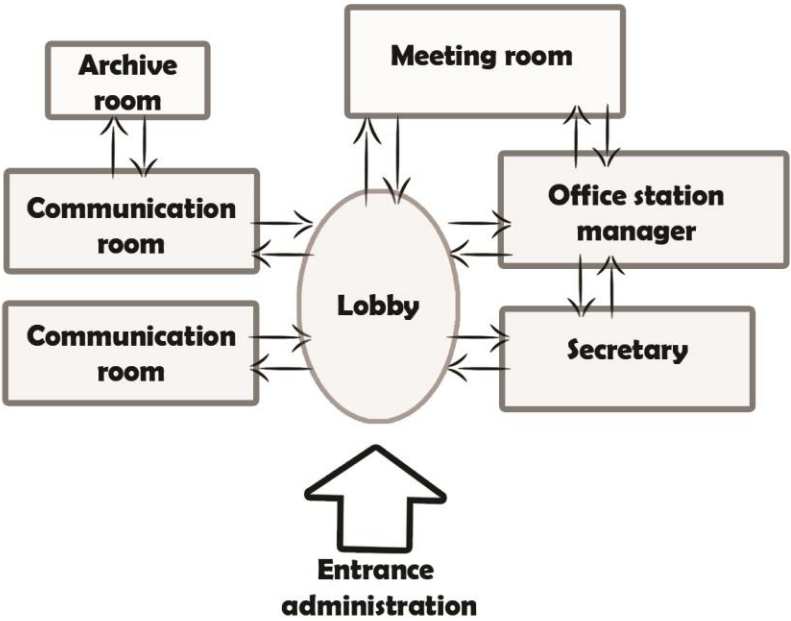


1. Core Area



Core areas focus on processing passengers. Conceptually, they can be considered as a circle surrounded by closely related areas that includes ticketing, information, baggage handling, reclaiming, and waiting.

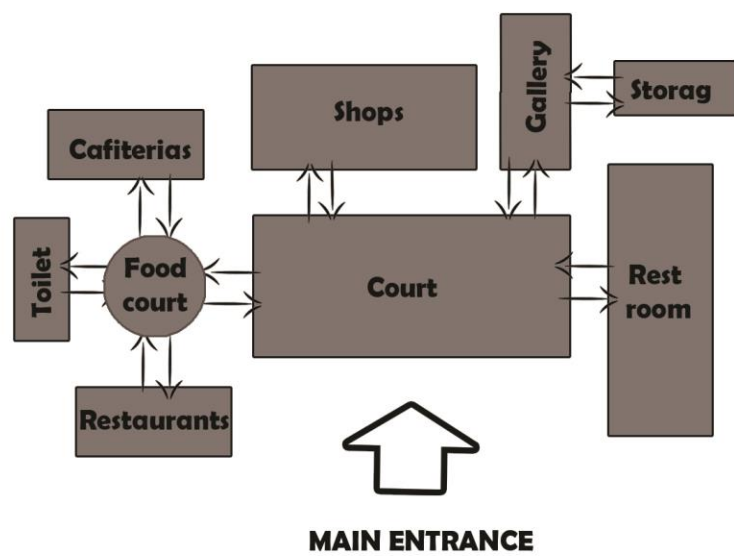
2. Administration



Administrative area control both traffic and station management. These areas can be isolated from other facilities or inserted among them.

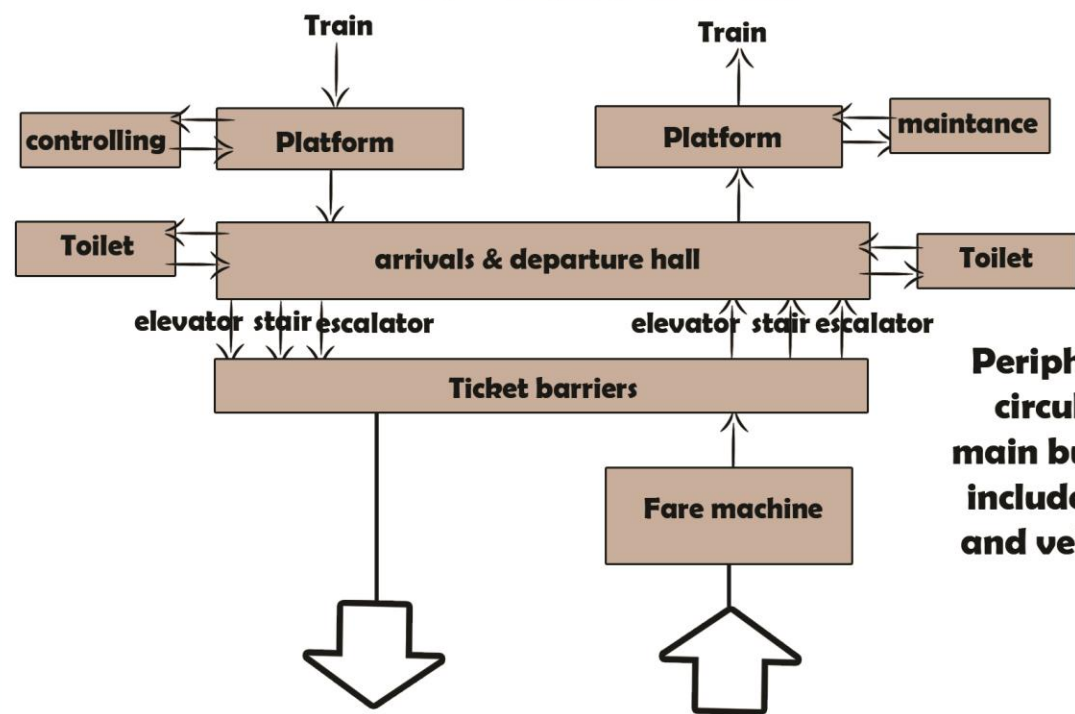
6.2 circulation diagrams

3. Transit area



Transit areas connect transit facilities in the core areas to the transportation modes. They usually include secondary, but often-essential facilities such as, restrooms, telephones, and commercial spaces.

4. Peripheral areas



Peripheral areas support circulation outside the main buildings. They often include platforms, tracks, and vehicle service spaces.

Parking circulation example 1

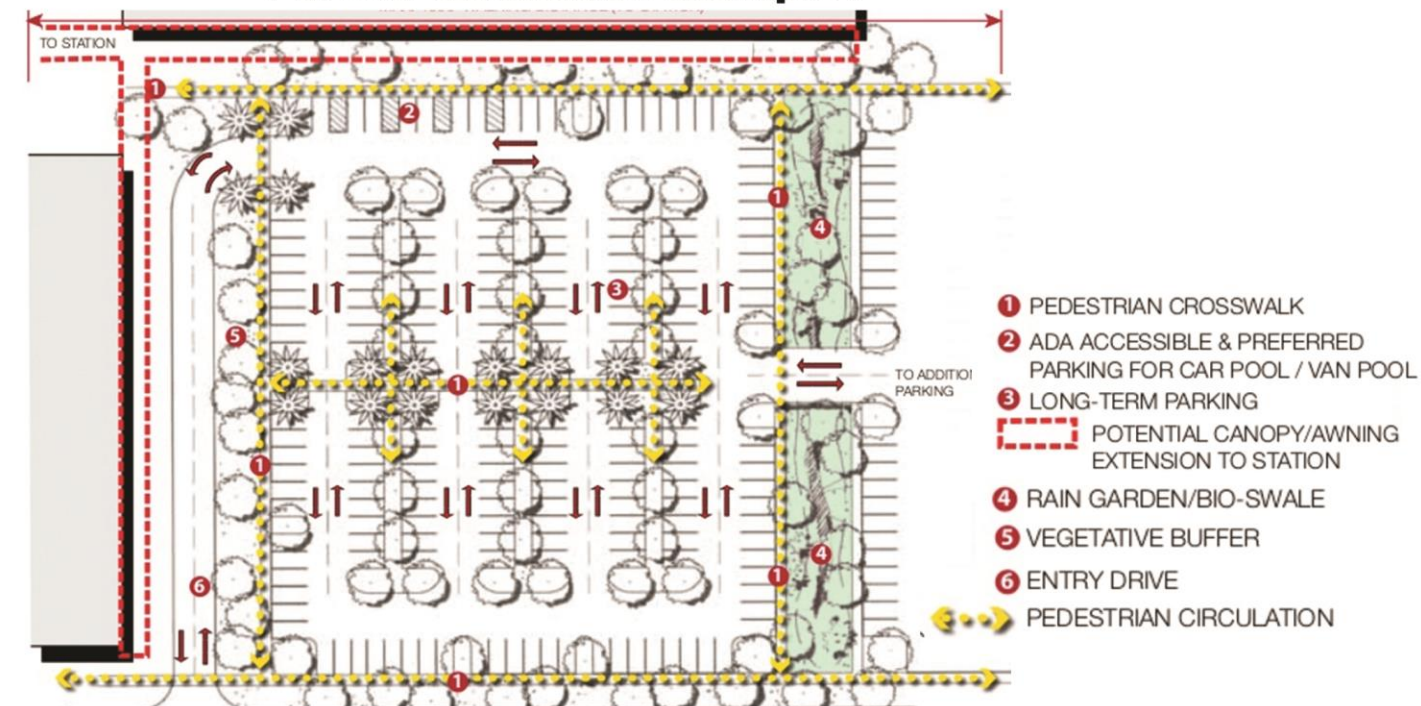


Figure 21

Parking circulation example 2

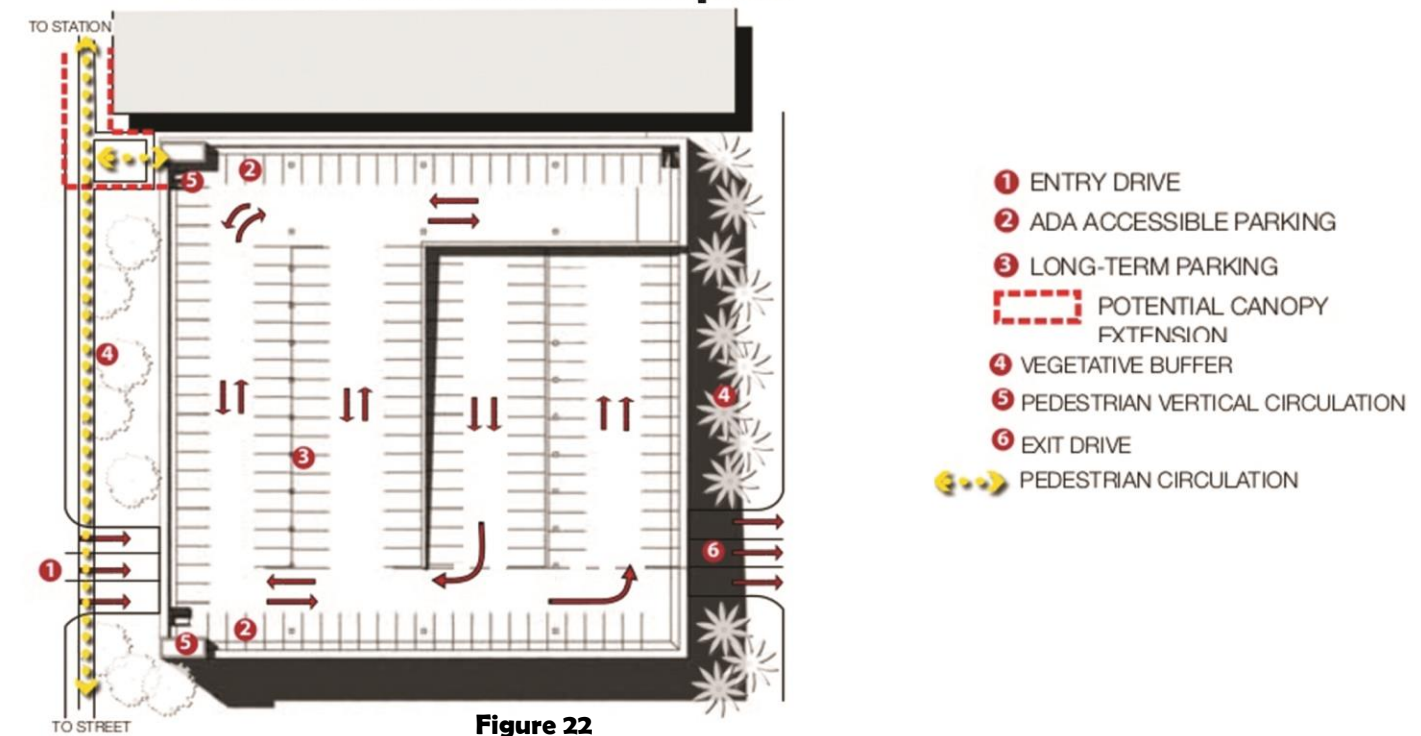


Figure 22

6.2 Design consideration

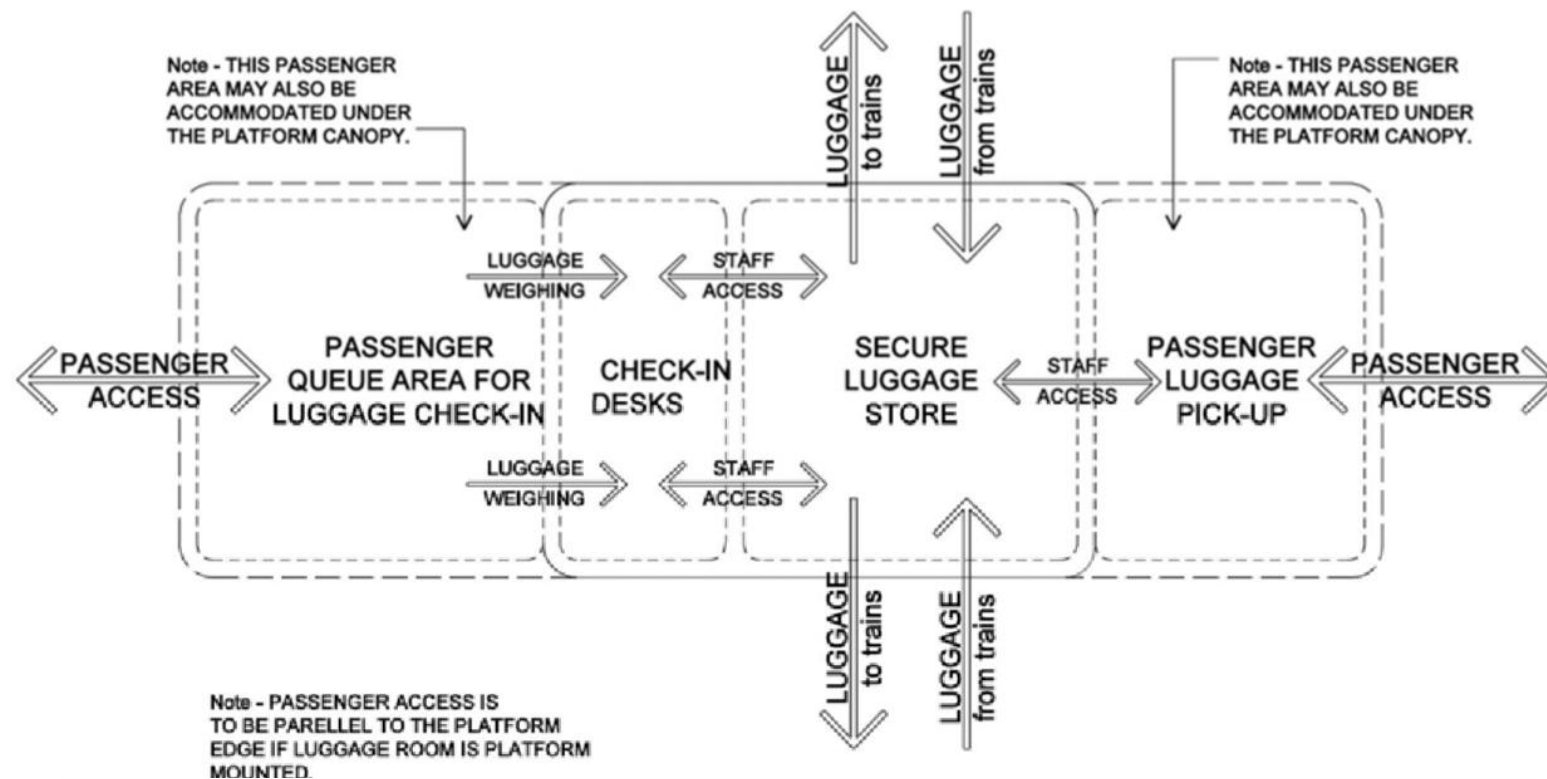


Figure 23 Luggage Room Functional Requirements

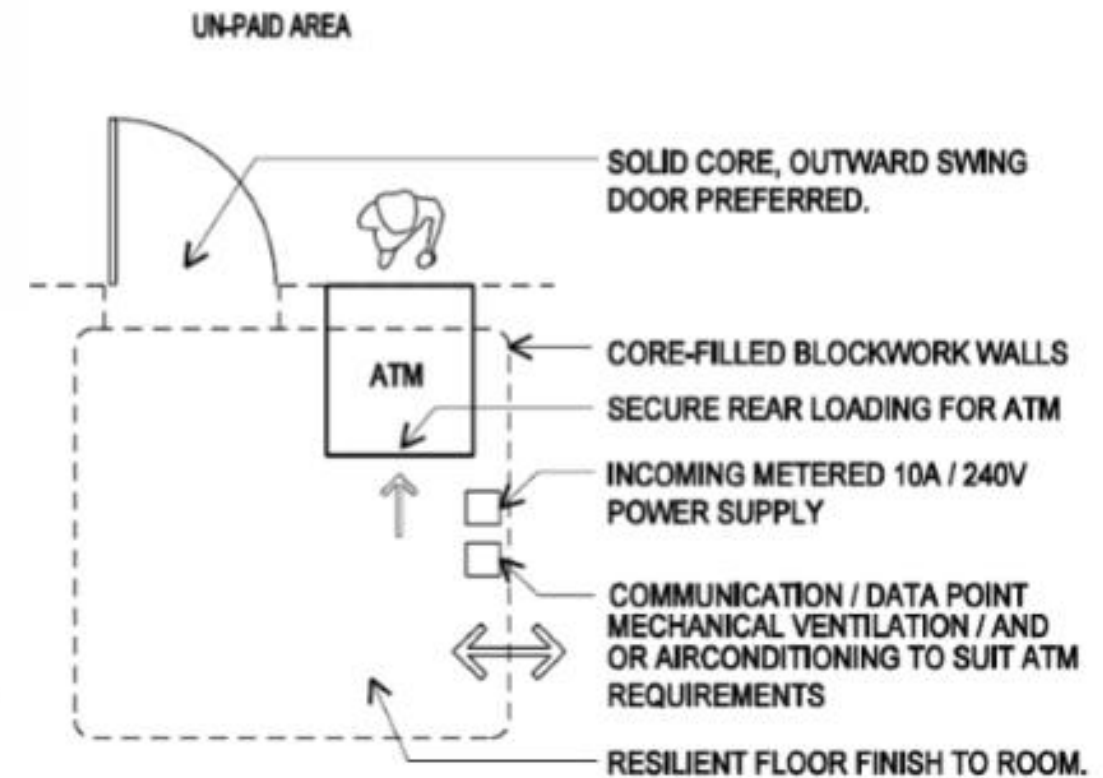


Figure 24 ATM Room

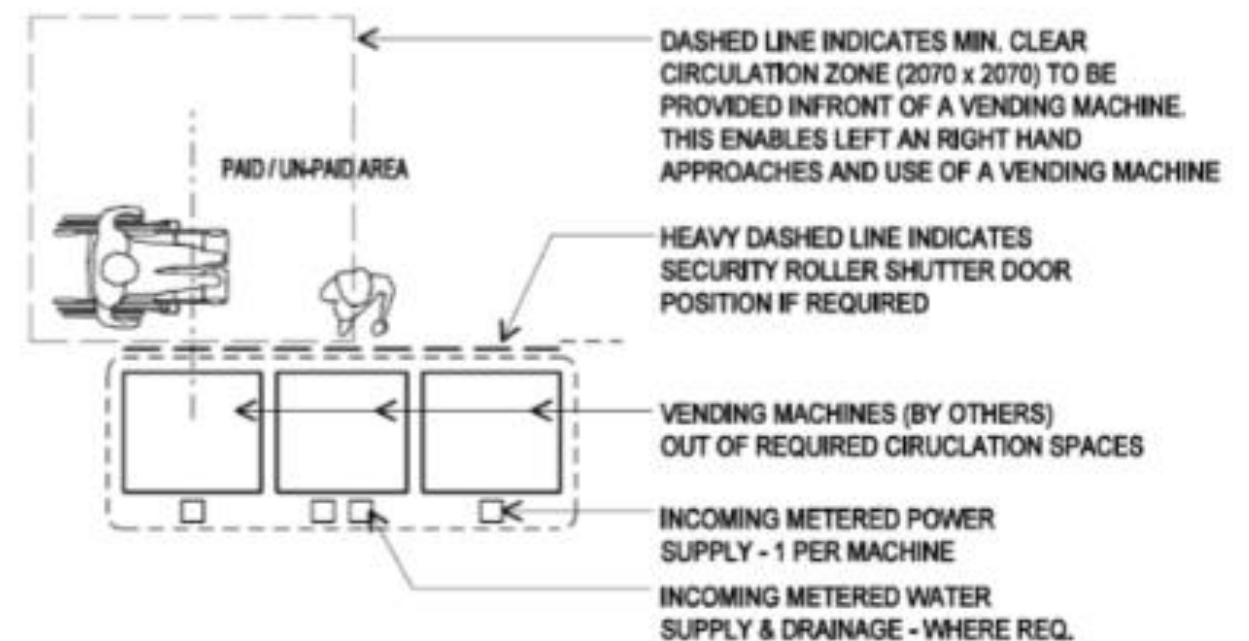


Figure 25 Vending Machine – 3.3 m2

7. Project program

Train Station project
in Borg EL-Arab

Space	Capacity	NO.	Area	Unit	Total area
Core Are					
Tickets	4	4	9	m2	50
Ticket machine	0	4	1.2	m2	5
luggage room	4	3	36	m2	108
cash machine	0	4	0.4	m2	1.6
Snacks machine	0	3	0.8	m2	2.4
Information desk	4	3	8	m2	24
waiting hall	600	1	1500	m2	1500
First Aid	6	2	60	m2	120
Mechanical room	4	1	9	m2	9
Toilets	25	2	75	m2	150
pharmacy	12	1	50	m2	50
Total				m2	2128.4
Administration					
Office station manager	1	1	15	m2	15
secretary	15	1	40	m2	40
Communication room	3	1	12	m2	12
Controlling room	4	2	9	m2	18
Lost bags room	2	1	20	m2	20
Meeting room	8	1	25	m2	25
Archive room	2	2	8	m2	16
Cash counting office	2	1	8	m2	8
Toilets	6	1	18	m2	18
Total				m2	290
Servecis					
post office	3	1	16	m2	16
security room	10	2	30	m2	60
Cleaning machine room	2	2	8	m2	16
Cleaner room	2	2	8	m2	16
Toilets	5	1	15	m2	18
Landscaping room	3	1	10	m2	10
maintanance employe	2	1	8	m2	8
Total				m2	144

Transit Area					
Shops	15	5	28	m2	142
Rest room	100	1	150	m2	150
Cafiteria	50	2	200	m2	400
Restaurant	50	3	300	m2	900
Public telephone cabine	1	6	1.5	m2	9
toilets	20	2	60	m2	120
Court	200	1	500	m2	500
Total					2221
Peripheral Area					
ticket barriers	1	15	1.5	m2	22.5
Arrivals and departures hall	600	1	1500	m2	1500
Patforms	700	1	2016	m2	2016
Tracks		2	168	m	336
Maintanance	3	1	12	m2	12
kiosks	3	2	6	m2	12
Total					3562.5
Other area					
Parking	250	1	10000	m2	4200
Horizontal circulation	0	0	3720	m2	3720
Total					7920
Total				m2	16256,9

Ticketing Facilities

- Ticketing facilities at a station entry must be located:**
- Away from the circulation paths, vertical circulation elements and queuing areas.
 - Within view of the station entry points
 - Within the ‘unpaid’ area of the station (preferred).
 - Under cover so that sunlight does not fall directly on the information display screens.
 - So as to provide staff selling tickets with an unobstructed view of the adjacent ticket vending machines, (TVM) the concourse and preferably the station entry points.

Information Systems

Information Systems: One of the most fundamental building blocks of station areas is the various forms of information Systems that range from signage systems to public address systems and technologies Information Systems at stations should communicate information that assures passenger safety and comfort, enhances operations of the station site, and aesthetically complement the theme of the station and surrounding site elements he use of consistent information Systems provides both real and perceived reassurances .

There are two types of information - constant and instant. Constant information can be described as that which describes the services and fares available and which changes only a few times a year or less. This information can be displayed on posters and fixed notices. There also might be special offers which can be posted from time to time. Instant information is that which changes daily or minute by minute. This is better displayed electronically or mechanically.

Information Systems

Synchronized clocks are required for staff reference in order to facilitate on time station operations A double sided 100mm high standard Rail Corp digital clock is located adjacent to the Control Room(approximately centered along the platform length) mounted perpendicular to the running track and set back from the platform edge.



Synchronized clocks

Help Points Help Points are a standard RailCorp fixture provided on platforms to provide passengers with a readily identifiable, easy to use, internal emergency phone Wherever possible help points are to be integrated with other fixed elements.



Figure 26 SIntegrated station ticketing facilities and waiting area comprise the interior .



Figure 27 show Information Systems



Figure 28 . Show some information systems in platform

8. Design consideration

Public Telephones

- Is the proposed site readily accessible and safe to Telstra staff and contractors.
- Will the public telephone be readily visible to passengers but remain clear of the required Ralcorp circulation zones.
- Provision of incoming telecommunications and 240 v power infrastructure that is reasonably accessible and secure.



Emergency Vehicular Access:

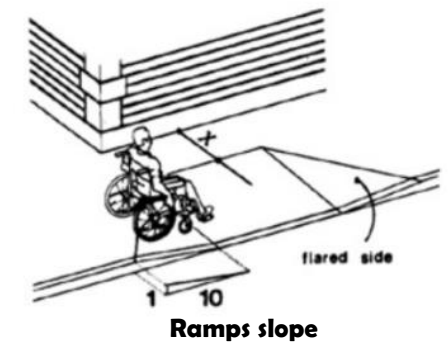
Emergency access (fire and ambulance) is critical and must be provided at all station areas and Park and Ride facilities. Roadway circulation within the parking lot configuration must have ample radii (typically between 45-50' outside curb radius for a fire truck with ladder) to allow fire truck access to the station.

The requirements of the disabled

- . Elevators or ramps.
- . Handrails on ramps and stairs.
- . Large-print and tactile Braille signs.
- . Audio and visual information systems.
- . Accessible station booth windows.
- . Accessible ticket vending machines service-entry gates at subway stations e Platform-edge warning strips
- . Telephones at an accessible height with volume control and text telephones TTYs .
- . Accessible restrooms at commuter rail stations with restrooms (not all station buildings have restrooms).



Braille sign



Ramps slope

Furniture and free-standing devices

- Within the station confines, furniture and freestanding devices (including cantilevered and suspended items) shall be positioned where they do not obstruct blind or visually impaired people, or they shall be detectable by a person using a long cane.
- On each platform where passengers are allowed to wait for trains and at every waiting area, there shall be a minimum of one area fitted with seating facilities and a space for a wheelchair.



Furniture and free-standing devices



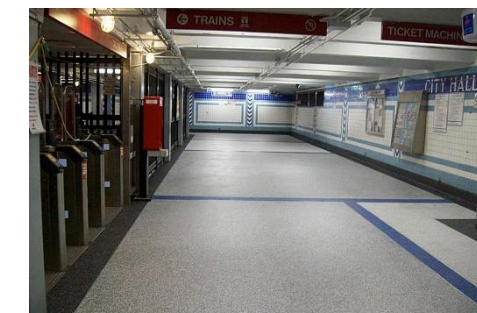
The platforms are marked to show people who are going to board the train where they should stand so that they are not in the way of those who will be exiting the train. The trains stop precisely where they are meant to so that the doors align with the markings on the station floor. enforce the yellow safety line and who announce each arriving train with a sharp whistle.

Floors

- Floor surfaces should offer a level of slip resistance that provides a firm foothold and good wheel grip under normal conditions of use.
- Floor finish materials will be of sufficient mass and thickness to resist any possible train generated vibrations and materials capable of providing large slabs will be used.

Lighting

- public buildings are designed to make use of natural lighting, although care should be taken to minimize glare and strong reflections from surfaces.
- White artificial light is more effective than yellow artificial light in terms of its color rendering properties and in creating true color appearance.
- In passenger lifts, lighting should be uniformly distributed, avoiding the use of spotlights, as they can cause difficulties for visually impaired people.



Floor surfaces

8. Design consideration

Train Station project
in Borg EL-Arab

Waiting area

If there is a station waiting room that shelters the transit audience indoors, and they have the time the room can be emphasized with artistic furniture, providing riders with a startlingly different place to sit. The user is provided with a more comfortable place to sit as well as something amusing to look at, with enough variety to engage multiple viewings. The Waiting Area Walls and Semi-Covered Corridors.

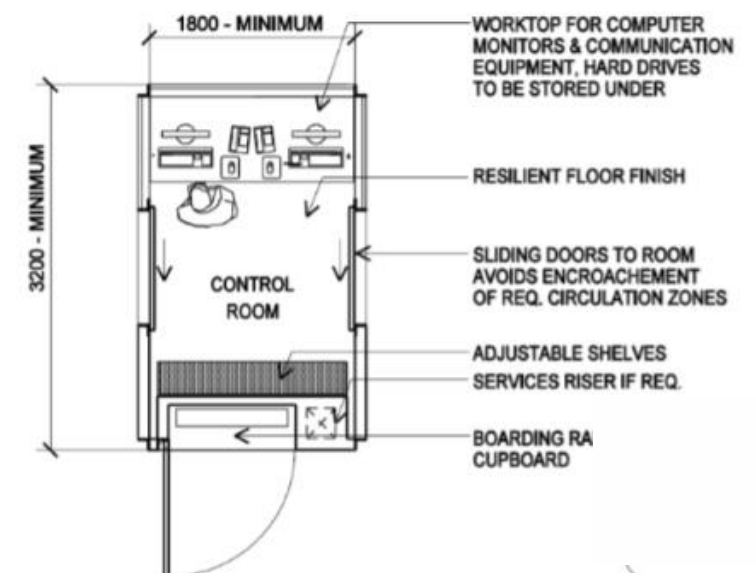
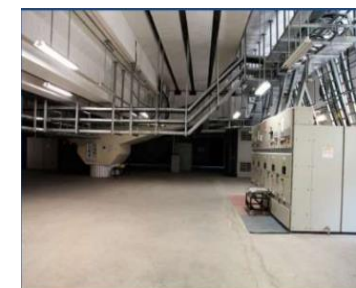
Trash receptacles

should be located conveniently in all pedestrian gathering spaces, at station entrances, and, where possible, placed near seating areas. All hematic receptacles must have lids, which are removable as a means to control unwanted odors. Removable liners should also be included in order to easily empty and clean the interior of the cans. Specified receptacles should be waterproof and designated bins for recyclables, such as glass, paper, and metal aluminum and are encouraged along central amenity areas and in proximity to seating areas.



Design consideration of control room

- Doors that do not impede circulation on the platform or within the Control Room when either dosed or held open.
 - A worktop large enough for computers and communications equipment as specified.
 - A below desk equipment hanging rack to house computer hard drives etc. to remove clutter from work tops and floors.
 - Equipment for local control of platform indicators, public address, platform lighting, station monitoring and communications.
 - Shelving for storing flags, whistles and passenger information leaflets.
- 2400mm minimum ceiling height.
- Passive and/or mechanical environmental control to maintain a comfortable work environment.
 - A boarding ramp cupboard(for the assistance of people with disabilities) integrated with the external cladding of the Control Room for station staff or train guard access.



Concessions

Concessions on railway premises can be a lucrative source of income for a railway and the opportunity to provide for them should be taken wherever possible. The normal types of concessions are coffee shops, refreshment counters and small lunch rooms, plus pharmacies, dry cleaners, newspaper shops and flower shops.

Lifts and Escalators

The siting of lifts and escalators is important. Passengers have to queue to board them so there must be space at the boarding point to accommodate a large number of people at busy times. Such areas must be kept free of obstructions and not be too close to platform edges. The number of stairways and escalators must be sufficient to allow a train load of alighting passengers to clear a platform before the next train load arrives. This may seem obvious.

8. Design consideration

Emergency Egress Requirements

The objective of the fire safety strategy is to ensure that people can move away from a potential fire or danger. There are numerous methods to achieve this, some relying on rules governing escape routes and others emphasizing evacuation time.

the primary standard for fire and life safety, . The principal of the standard is to establish a reasonable occupant load, then design enough means of egress for that population to leave the station platform within 4 minutes in the event of an emergency. Further the standard requires that the 'occupants' should be able to escape to a 'point of safety' within 6 minutes.

The key design aspect for means of escape is to utilize the main entry and exit routes for escape, not the traditional method of using separated fire isolated stairs, as would be used in a retail or commercial building. The main entry and exit points of the station are aimed at moving high volumes of people quickly. In a fire emergency, this is exactly what is required; people to be moved off platforms as quickly as possible. Therefore, it makes sense to use the escalators. This is the approach of fire safety that is used throughout the world on major transport terminal projects.

Safety and security by design

- The movement of people in proximity to moving trains.
- The safety of passengers and personnel in proximity to electric lines.
- The sizing and treatment of surfaces of concourses, passageways, ramps, stairs, escalators and platforms.
- The number, size and spacing of entrances, exits and the emergency evacuation arrangements.
- The provision of adequate lighting and emergency escape lighting.
- Suicide prevention measures
- Separation of passenger and vehicular movement, to include adequate control measures at the interface between the two.
- Security Systems: There should be Closed Circuit Television Cameras(CCTVs) at each station in all passenger and parking areas to provide security and reduce vandalism. cameras, equipped with remote pan-tilt zoom control.

Ticket gates

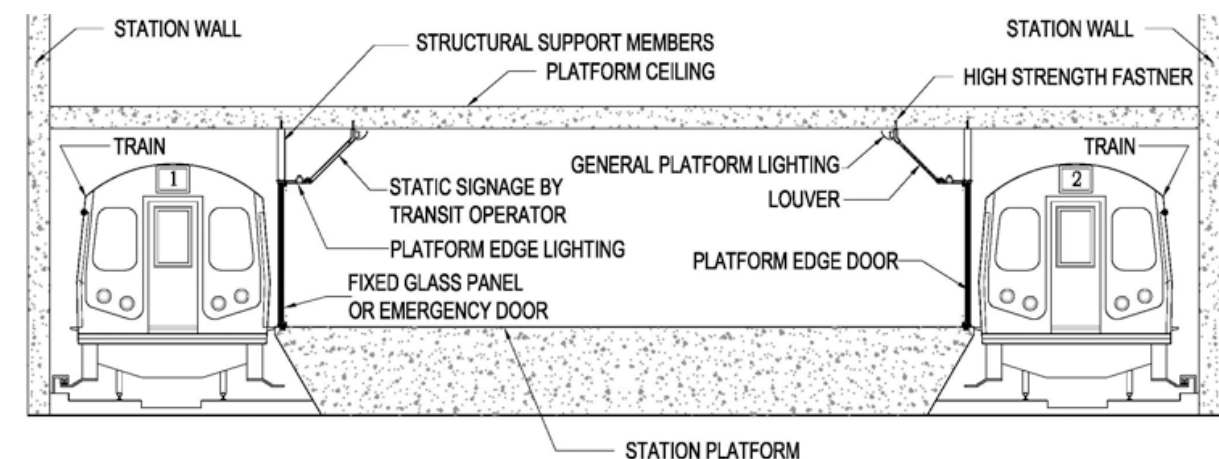
ticket gates have been very successful in reducing ticketless travel they also help to reduce anti-social behavior and improve on-train and station security ,width of 900 mm and shall be able to accommodate a wheelchair up to 1250 mm in length.



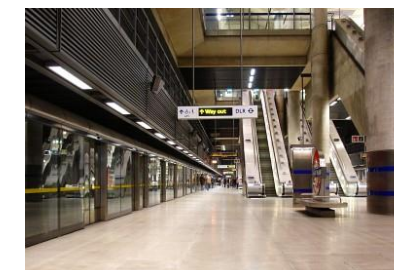
Ticket gates

Platform Screens

There has been a trend recently in modern platform systems towards incorporating glazed screens along platform edges .



TYPICAL UNDERGROUND ISLAND PLATFORM SECTION



London Canary Wharf station, Jubilee Line Extension.



Copenhagen

8. Design consideration

Side Platform Station

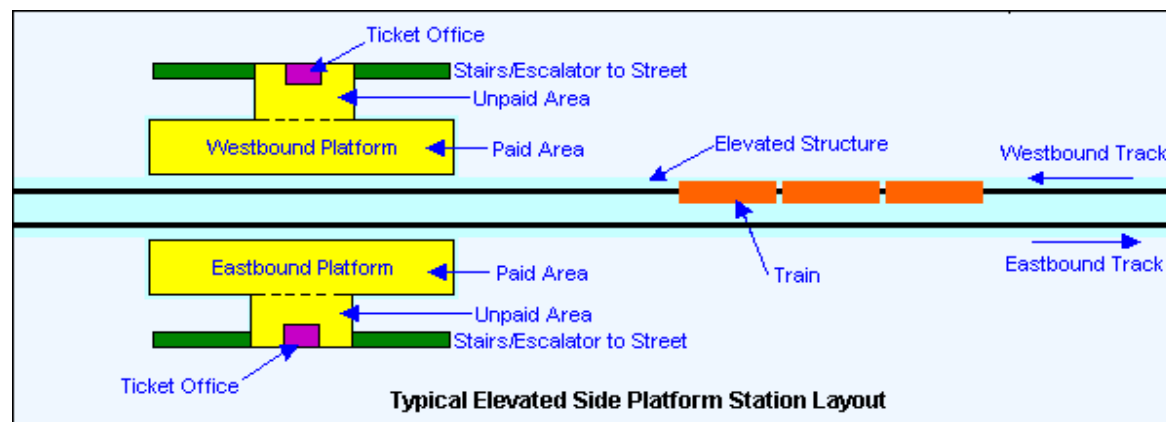
The basic station design used for a double track railway line has two platforms, one for each direction of travel.

Each platform has a ticket office and other passenger facilities such as toilets and perhaps a refreshment or other concession. Where there is a high frequency service or for with high platforms, the two platforms are usually connected by designs a footbridge. In the case of a station where tickets are required to allow passengers to reach the platform, a "barrier".

Island Platform Station

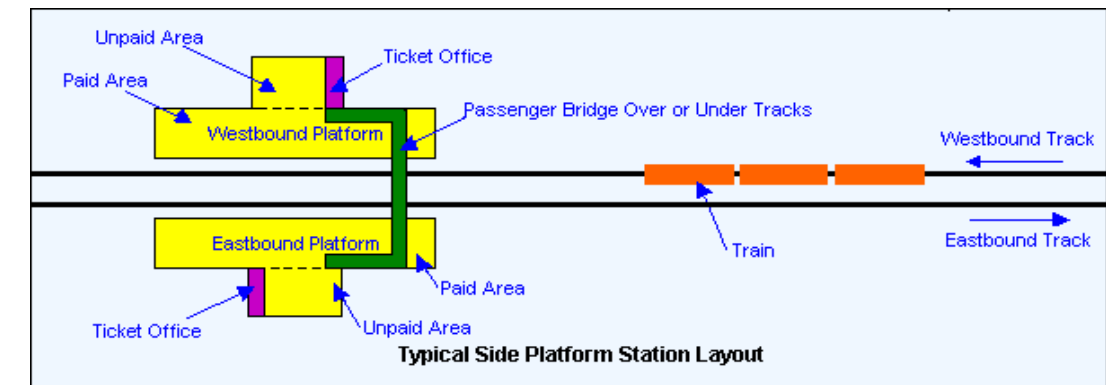
this is a single platform serving two tracks passing on either side, effectively creating an island which can only be accessed by crossing a track. A bridge or underpass is usually provided. Island platforms are usually wider than single platforms used for side platform stations but they still require less area.

Elevated Station with Side Platforms

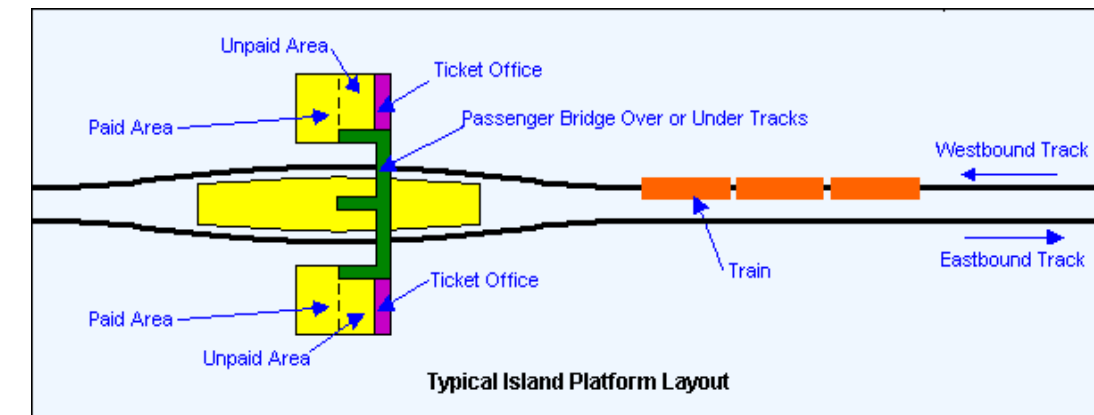


Elevated Station with Ticket Hall Below Platforms

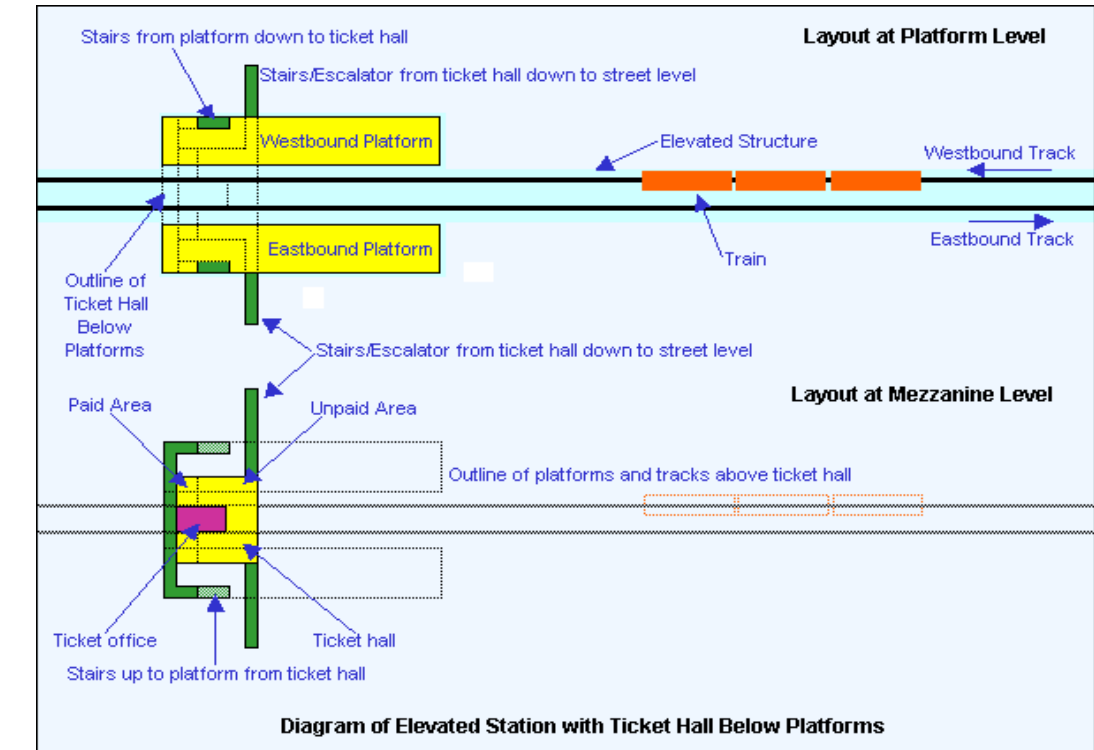
the ticket office and gate lines are below the platform level. This can be done to allow one ticket office to serve both platforms but it requires the space to be available below track level and this, in turn, requires enough height in the structure.



Side Platform Station



Island Platform Station



Elevated Station with Ticket Hall Below Platforms

8. Design consideration

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Figure show Platform Circulation Requirements

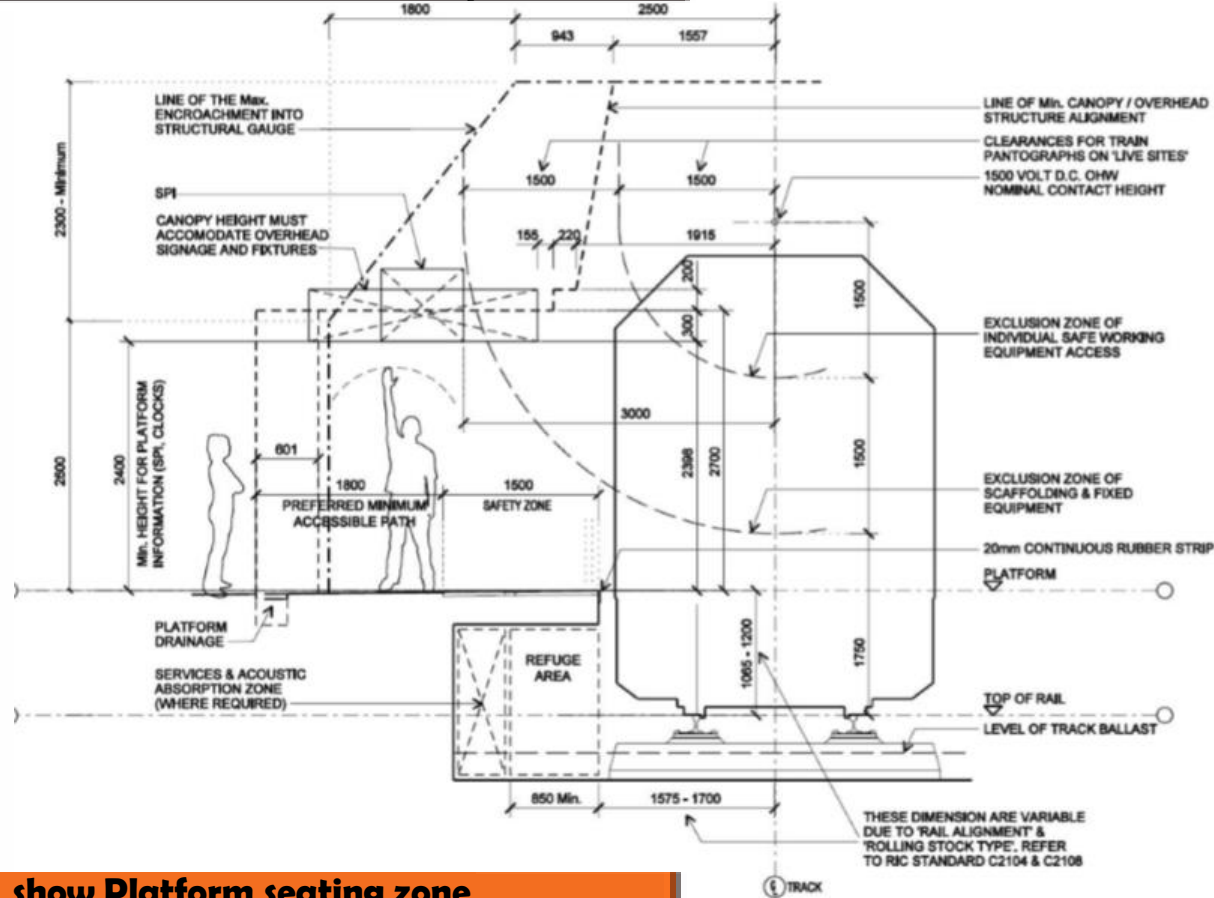


Figure show Platform fall requirements

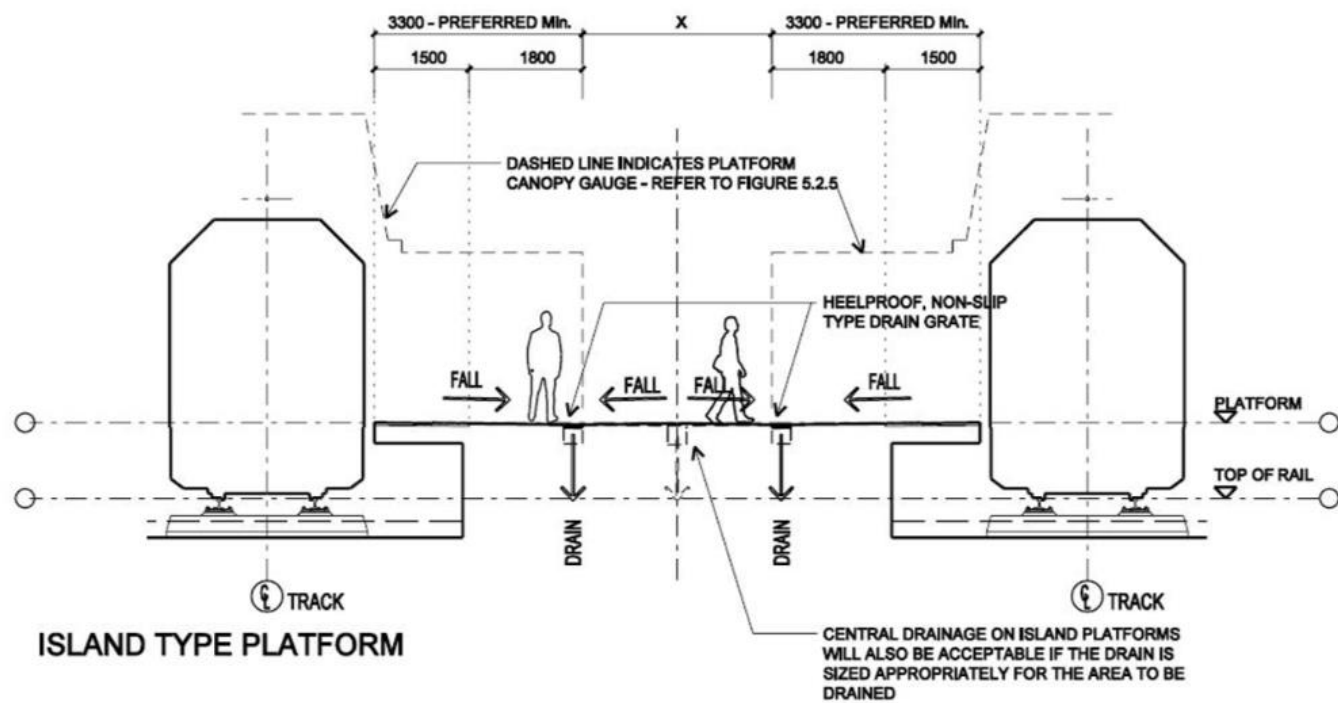


Figure show Platform seating zone

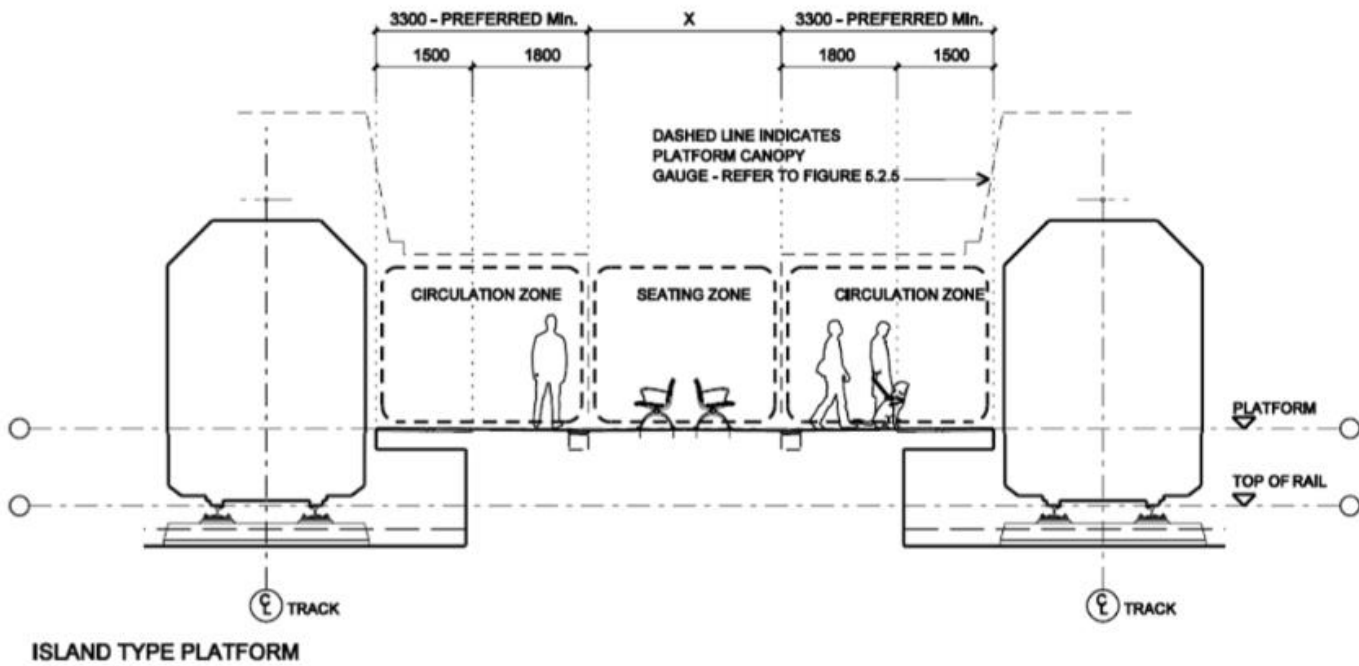
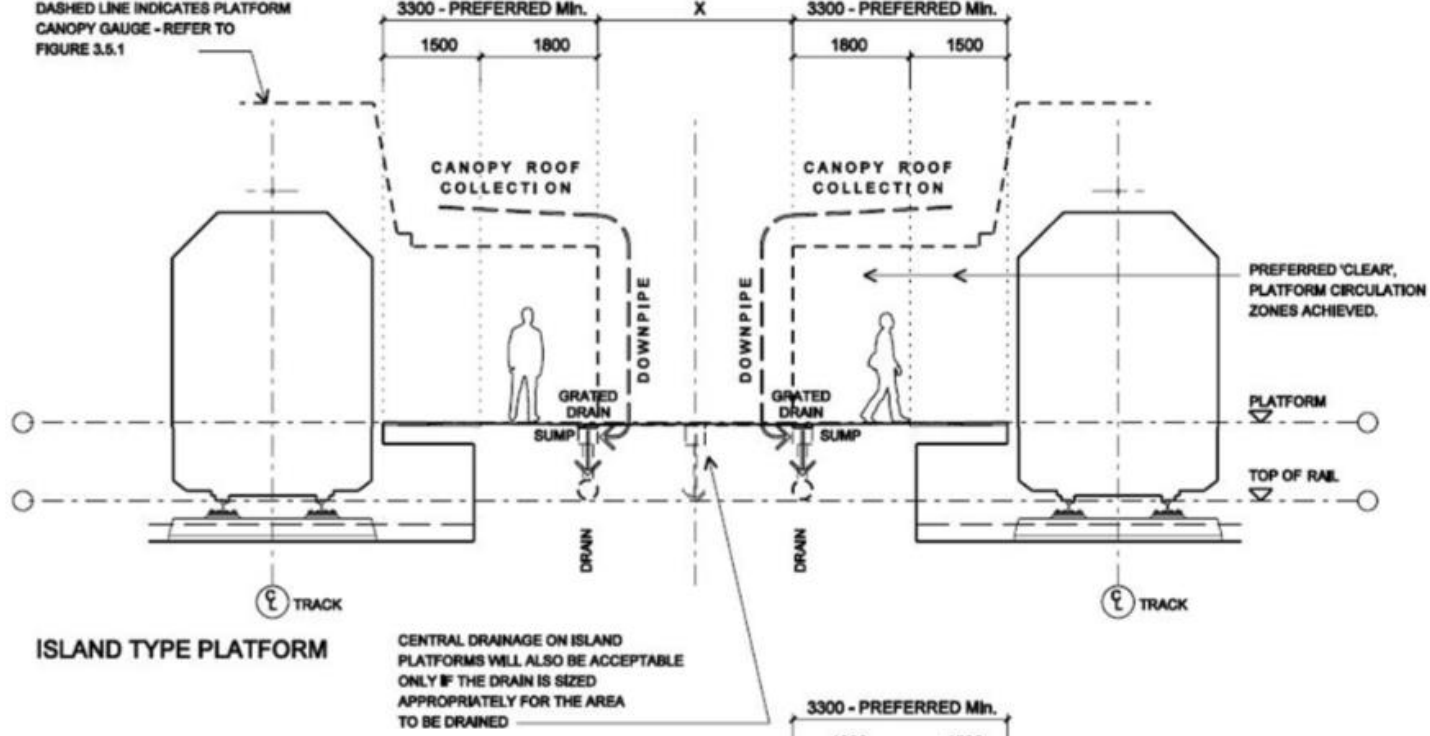
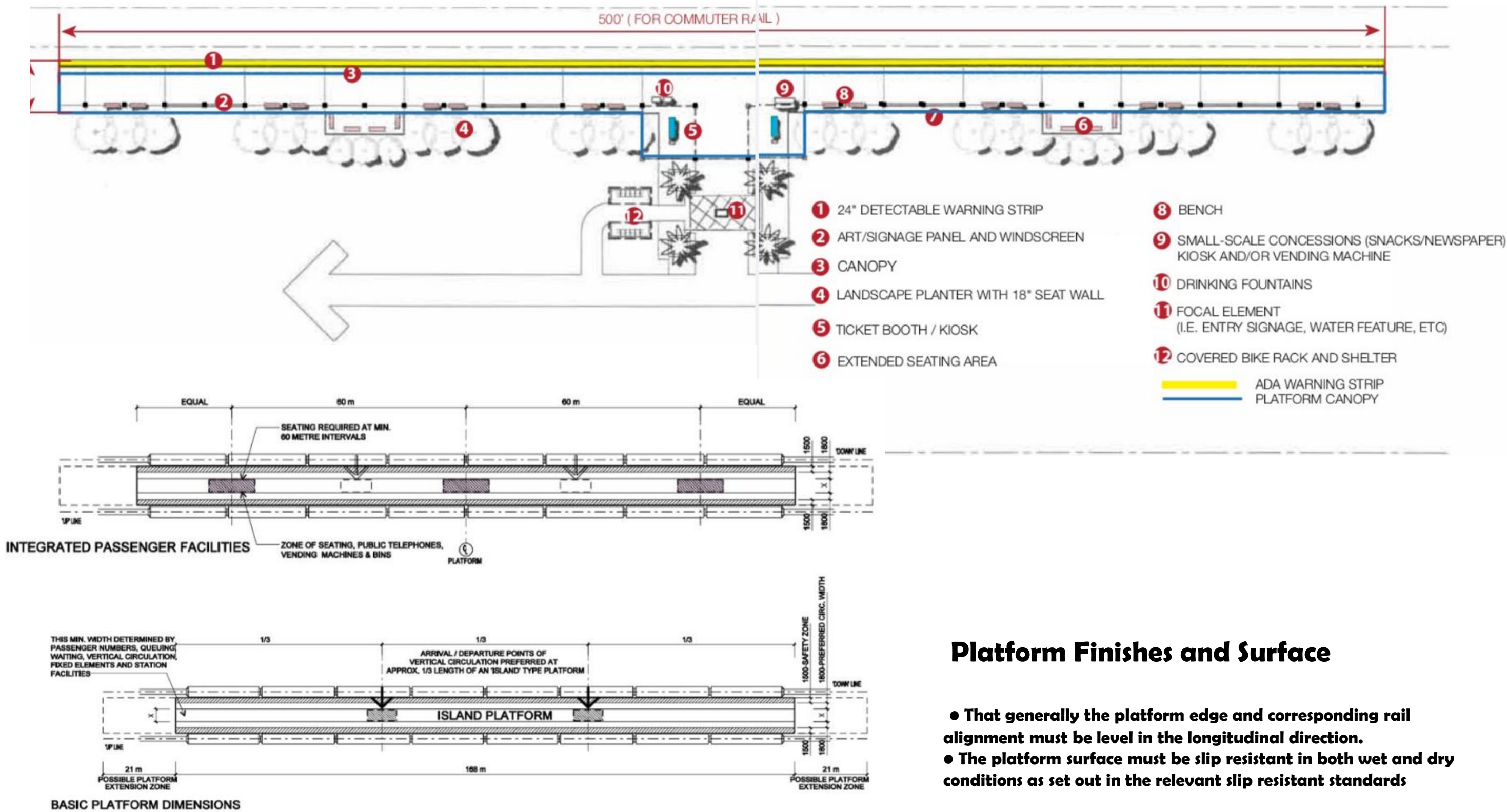


Figure show Island type platform



elements of the station platform area

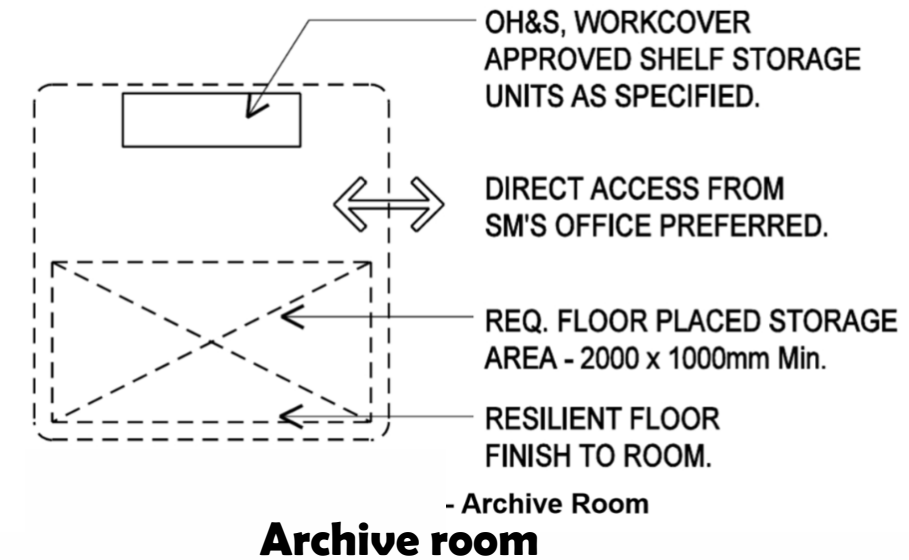
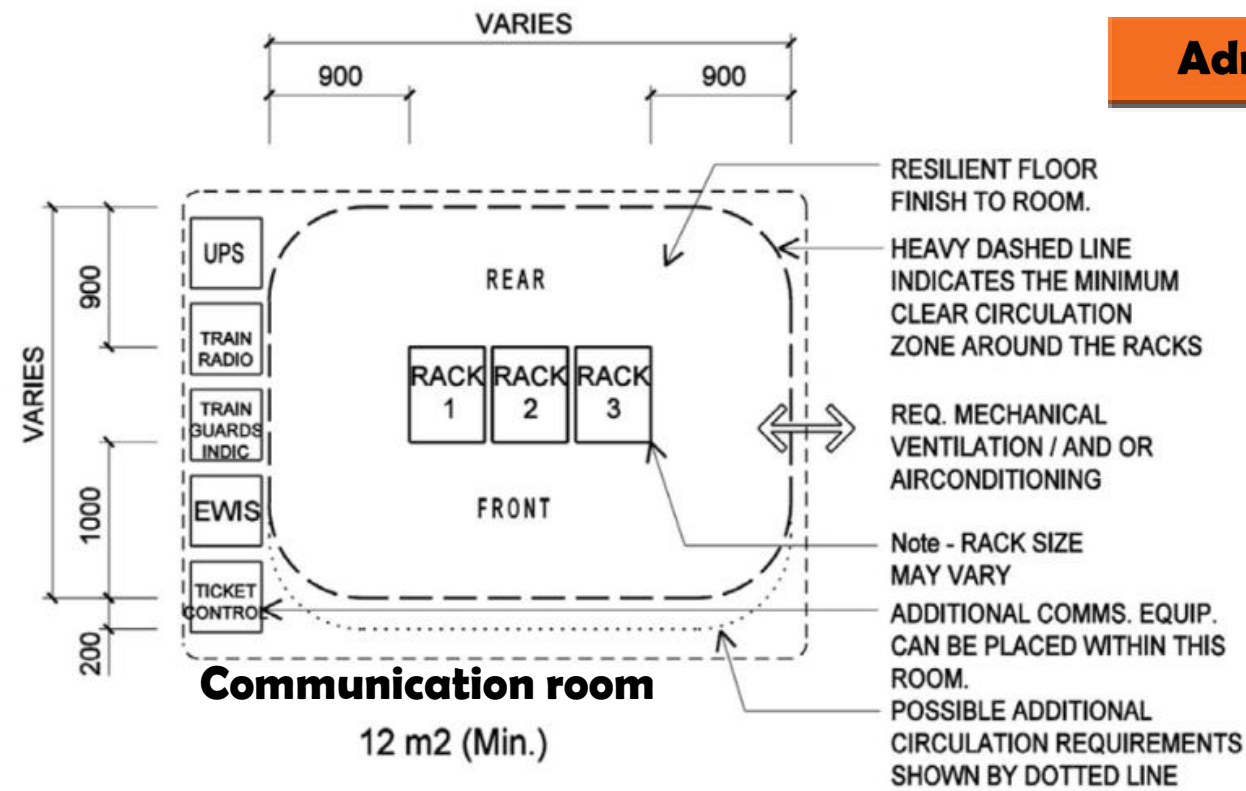


Platform Finishes and Surface

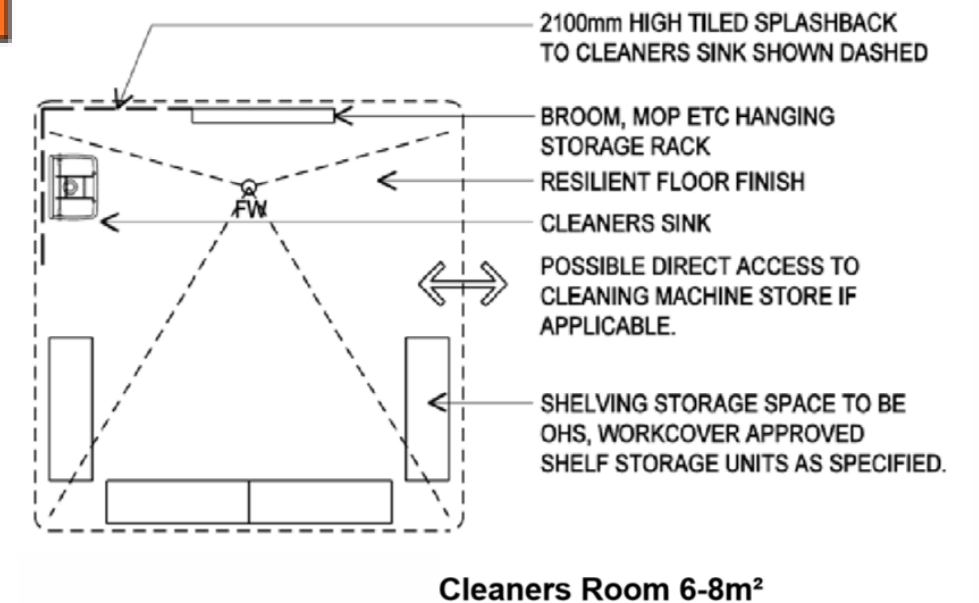
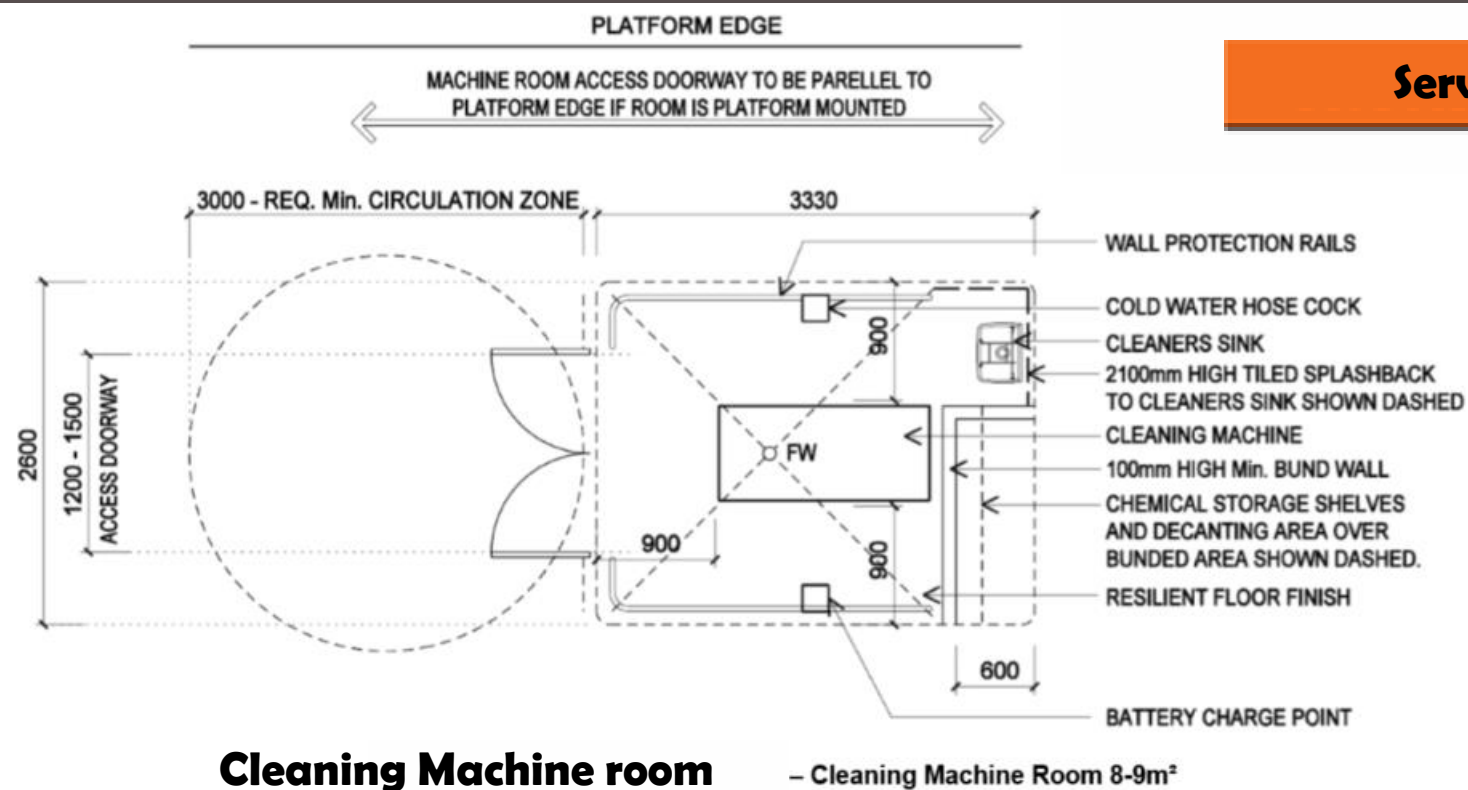
- That generally the platform edge and corresponding rail alignment must be level in the longitudinal direction.
- The platform surface must be slip resistant in both wet and dry conditions as set out in the relevant slip resistant standards

8. Design consideration

Administration zones



Services zones



Cleaners room

books

1. STATION FUNCTIONAL SPACES book
Version 1.1
Issued May 2010
2. Design Standards for Accessible Railway Stations
Version 04 Valid from
20 March 2015

Websites (December 2015)

3. <https://designtheorykje.wordpress.com/2012/11/08/lyon-saint-exupery-airport-railway-station/>
4. <http://www.slideshare.net/crazypeigun/building-construction-project-2>
5. <http://www.slideshare.net/ikhwann/lyon-satolas-station>
6. <http://futuretransport.us/urbanism/2010/8/16/survey-satolas-tgv-station-lyon-france.html>
7. <http://www.galinsky.com/buildings/lyonairport/>
8. <http://www.arcspace.com/features/santiago-calatrava/liege-guillemins-tgv-station>
10. <http://www.arcspace.com/features/santiago-calatrava/liege-guillemins-tgv-station>
11. <http://www.dezeen.com/2009/12/02/liege-guillemins-station-by-santiago-calatrava>
12. <http://www.eurogare.be/en/benchmarks.html?IDC=154>
13. <http://www.eurogare.be/en/in-the-heart-of-the-station.html?IDC=156> <http://www.groupseco.com/en/li-ge-guillemins-station>

Other

15. Google earth
16. Google map
17. Ecotect analysis